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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

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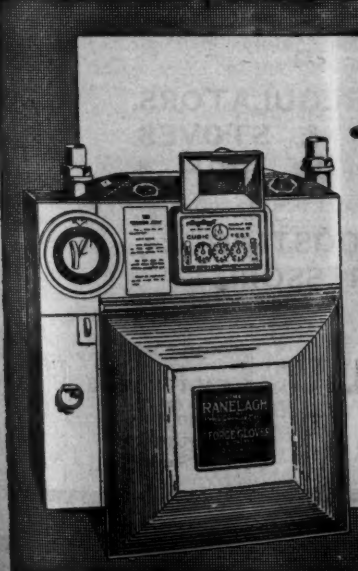

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VOL. CLXVII., No. 3197.] WEDNESDAY, AUGUST 20, 1924. [76TH YEAR.

EDITORIAL NOTES.

Pull Together in Ireland—Cheaper Gas Appliances.

HEARTY congratulations to the members of the Irish Association of Gas Managers upon the resumption of their meetings after a five years' hiatus. That period ago, the President who was in the chair last Wednesday (Mr. W. E. Young, of Queenstown) was elected to office. Since then many things have happened. Ireland has been through much tribulation, and has emerged, with an occasional surge on the calm, into more peaceful times, though again there is fear of more politically stormy days; but we hope these will be averted. However, gas undertakings as public utility concerns have no active or direct part in these matters; their duty is to serve the public with fidelity and impartiality. This the gas managers of Ireland have done. Through the years of turmoil, in circumstances of a singularly repressive character, they have performed their duties to the public with the highest possible efficiency, though isolated and denied the opportunities for fraternizing and conferring one with the other. But the time has come when the opportunities should be restored—when the gas industry of Ireland should be completely organized so as to obtain the maximum benefit from co-operation and collaboration. This must first begin at home, and then a proper linking-up with the central gas organizations in Great Britain would add to strength and resources. Looking around at misformed political aspirations and adventure in respect of electricity, having regard to competition, and to the uncertainties of the markets for gas-works supplies and the secondary products of gas manufacture, the gas industry of Ireland will greatly strengthen itself by bringing to bear upon all its operations the influences of sound organization.

If the attendance at last Wednesday's meeting has any real significance, it is that there is a full appreciation of this, and just the spirit prevailing which will accomplish much. We are glad to recognize this, and to believe it; and for two reasons: It will encourage those who have put forward earnest efforts—the Hon. Secretary and Treasurer (Mr. George Airth) may be specially mentioned in this connection—once more to re-establish the vitality of the Association; and it will nullify the references of the Committee in their report to the apathy of the members of the gas profession There has undoubtedly been apathy. The report tells us that, in spite of repeated endeavours to get the Association on a good footing, there has not been that response to the call for unity which times and circumstances demand. A strong plea is made to those who have not responded to do so without further hesitation. That plea will not fall on deaf ears in Ireland. The Committee know it and feel it; for in their report they say they "face the future with confidence in the co-operation of their brethren in every part of Ireland." The attendance at the meeting was the beginning of what we hope will be a complete justification of that confidence. Knowledge of the work which awaits the Association and any development of it—say, by way of a Commercial Section and by co-operation with the British organizations—must act as a spur to increased endeavour, and make the body one which can speak authoritatively for the gas interests of Ireland. This is more necessary now that Ireland has its own Governments.

The present position of gas affairs in the country was well reflected by the paper contributed by Mr. T. J. Reid, of Ballina, in which he essayed to bridge the quinquennium during which there has been a lapse in conference. As both the President and Mr. Reid showed, there have been great changes in the technical and commercial conditions of the industry during the five years—not one of which has come under the review collectively of the gas managers of Ireland. The gas undertakings to-day which occupy positions behind those in the front rank are suffering from several things; and for their security and progress it is necessary to attempt to re-fashion as far as possible those conditions which can be dealt with from within, so as to place them in better state to meet the circumstances over which there is no control. That should be one of the foremost objects of the Association to-day. The costs of coal, freight, and labour are, Mr. Reid tells us, respectively 50, 250, and 300 p.ct. above pre-war figures. That is a serious position. Yet gas is cheaper than electricity as a lighting, heating, and power agent; and while gas prices are to the consumer only double those of pre-war time, retail coal prices are two-and-a-half times more. One would imagine that these conditions would place gas in an unassailable position; but it is not so. Ireland has her own particular brand of temperament, and her own standards of requirement. These have a great influence upon the business of the gas industry there. Novelty rides to the winning-post, despite such obstacles as the efficiency and economy presented by other competitors. Ultimate cheapness, too, does not have such impressive claim as immediate cheapness. Hence the campaign as to the miracles that are to be achieved from the waters of the Shannon and the Bann by State assistance has taken hold of the imagination; and though small hydro-electric schemes have proved a failure, the experience has no deterrent effect.

The influence upon lighting of "summer time" and "uniform time" in Western Ireland provides a paragraph in Mr. Reid's paper which is well worth reading. Following up, however, what we have been saying, there is a section of it which shows that the high thermal and working efficiencies of gas appliances do not appeal to the people as effectively as they should do; but the less efficient oil heating and cooking appliances have found a good market, because of their immediate cheapness. Thus we find the author appealing to the manufacturers of gas appliances to assist Irish gas managers to meet their special conditions. The ordinary prices of British-made goods, it is said, hamper development of the cooking and heating business; and the argument is advanced that, if one cannot do business in types of the Rolls-Royce order, then the Ford must be used for the purpose. In short, Mr. Reid is of opinion that what is wanted in the gas appliance trade is a Henry Ford. Our gas-stove manufacturers will be interested, and will cast round for a likely man for the place. Mr. Reid knows Irish requirements much better than we do; but in Great Britain his views would not be endorsed. We should like cheaper gas appliances, but not through the sacrifice of anything in the way of thermal and working efficiency. We had our Henry Fords in the gas appliance business before the war. They have been buried; and we have not even erected a memorial to their names. We would rather forget them, for they did an infinite amount of harm to the gas-heating business; and it is only by higher grade and efficiency goods that their memories and work have been slowly blotted out. Cheapness and poor performance usually go together. Excellence of performance is a good advertiser. The poorest people in this country employ slot-meter cookers; and they are well pleased with them, as is shown by the increasing use they make of them. We really do not know what Mr. Reid is after if he needs anything structurally inferior to them. Lighter-built appliances are wasteful to the consumers through loss of heat; and maintenance and replacement costs are heavier through

the shortness of life. It seems to us that it is gas education the people require; and this, carried on with intensity and systematically, would have life and influence far outstripping those of lightly constructed gas appliances. The educative work should be well advanced before State-aided electricity enters into competition, if ever such schemes—hydro or otherwise—are brought into being. It is a strange thing that the State Government should have entrusted a German firm with the work of examining into the practicability of such a scheme; and it will be equally strange if the firm does not report favourably, and try to secure the work for the Fatherland. This is one of the directions in which a live and fully representative Irish Gas Managers' Association should be able to do really excellent work. No such scheme should be allowed to be developed without being critically examined from all points of view, especially in the interests of the tax and rate payers, among whom the gas undertakings have not an insignificant standing.

For this and many other reasons we urge the gas managers of Ireland favourably to answer the plea so ably and earnestly put forward at the meeting last Wednesday by the President, the Committee, Mr. Reid, and Mr. Airth, and to consolidate their Association by a universal membership. "Unity is strength," and never was a strong gas organization wanted more in Ireland than now.

Wembley Grounds Illumination—Electrical Dissatisfaction.

Before the event there was much writing in the Press regarding the marvellous and gorgeous effects that electricity was going to confer upon the British Empire Exhibition. The grounds were to be brilliantly illuminated, the buildings were to have their fine architectural features projected upon the notice of an admiring public by special electrical arrangements, the waters in the open were to be rendered amazingly wonderful at night time by myriads of electric lamps imparting beautiful iridescent effects. Now we have the result. It does not come up to promise; and disappointment reigns in the electrical world. So much so that at the Illuminating Engineering Conference on Tuesday last week, there were a few bold spirits who had the courage of their convictions, and said what they felt. The criticism is one with which we agree. We have previously felt tempted to express as much as was said at the conference by electrical men; but there has been the feeling that our electrical friends would have merely replied that our views were those of the prejudiced. But there it is from electrical sources for all to behold. The general electric lighting of the grounds is dull and even gloomy compared with the life and brilliance that there is in the Amusements Park with the low-pressure gas-lamps, and which add so much to the attractiveness and gaiety of that part at night that people by general consent flock there to the neglect of many other sections of the great show. At the conference, this was pointed out in the paper, descriptive of the lighting of the Amusements Park, by Mr. G. L. Jennings.

However, with the consummation of the electrical scheme of general illumination, our competing friends have less to say as to the marvellous advertisement it was to be for them. They have had the mortification of experiencing several failures of the current at inopportune times, and the dull lighting of the grounds has not the anticipated effectiveness. Could the cost be ascertained, the public would, we imagine, have a mighty shock to find what a relatively small amount of illumination has been provided for the money expended. One cause of this is the high intrinsic brilliancy of the lights, and the character of the spherical globes which have been adopted to secure diffusion, and at the low heights of the lights to guard the eyes of the public from the discomfort which would otherwise obtain. Naked, the lamps give a high efficiency from the light standpoint; from the standpoint of pleasant and comfortable lighting, they would be, naked, the most inefficient. Hence the globular shield, which must be used, but which causes a waste of energy and therefore money. The high efficiency of a naked light is of little service if there has to be substantial reduction to make the light endurable. The physical characteristics of modern electric lamps are distinctly opposed to economy in current, if the illumination is to be consistent with human requirements, and not of a pernicious order. Notwithstanding the fact that it is supposed to be an important feature, we have met with visitors, too, who have been to the exhibition at night time, and have come away without their attention having been arrested by the flood lighting of the façades of the buildings.

Reference to our review of the proceedings at the conference in other columns will show that the Chairman (Mr. L. Gaster) dissociated the Illuminating Engineering Society from any responsibility for the results of the electric lighting. The view of other speakers was that more illumination is needed. The flood lighting was described by one of them as producing a "cold effect," which is not offset by the dimness of the illuminated spheres. In time to come, we may learn something as to the cost of this scheme which has not given universal satisfaction in electrical circles.

A Prospective Lord Mayor.

We learn from the Manchester papers that Alderman Fred. J. West, C.B.E., has accepted a unanimous invitation to allow himself to be nominated for the office of Lord Mayor of the city for the coming municipal year. No one doubts that November will see him duly installed in that high and honourable office; for in the civic life of Manchester he is a popular figure, and respected by all citizens whatever be their political views. All in the gas industry will rejoice in the proposed honour; for the name of West is inscribed deeply on the foremost panel of those men who have substantially contributed to the history of the industry, and the son is worthily maintaining in our midst the fine engineering and business record of the father. We cannot recall any other man who was born into the gas industry, and whose business life has been wholly devoted to it, who has previously had conferred upon him the signal honour of being invited to accept a Lord Mayoralty—and of such a famous and imposing city as Manchester. If this is so, the election (for the industry) will be a unique one. The distinction does honour to our friend and to the industry he serves; and we are assured, from personal knowledge and association, that the new occupant will do honour to the position. Alderman Fred. West we all know to be a strenuous worker. As in the gas industry, so in his work as a citizen and an employer. The local government of Manchester has been enriched by such men. Since his advent to the Council in 1906, he has taken many parts and offices in the work; and his engineering and administrative abilities have been at command not only by West's Gas Improvement Company, but by other local enterprises—notably as a Director of the Manchester Ship Canal. He has also been prominent as a member and President of the Manchester engineering organizations. Of the Council of the Society of British Gas Industries he has been Chairman; of all co-operative work between every section of the industry he has been an ardent supporter, and a strong advocate of united organization and co-ordinated effort. There is confidence that the "Manchester Guardian" speaks truly when it writes: "The new Lord Mayor will be warmly welcomed in all quarters when he is elected to office in November next; and he will be ably assisted by Mrs. West as Lady Mayoress."

High-Grade Claims for Low-Grade Gas.

When commenting on the address before the Waverley Gas Association last June, we took occasion to question statements which are so frequently made as to the volume consumption of gas of low calorific value being no more than that of gas of high calorific value for accomplishing a given amount of work. It is easy enough to show, as was then done, that the comparison must be on a thermal basis, and not on a volumetric one. Knowing the thermal efficiency realized by a gas of a calorific value of (say) 500 or 560 B.Th.U. for various operations, it can be proved that, if there were truth in the statement that an equal amount of work can be done with the equivalent or less cubic feet of a much lower calorific value gas, the latter would in some cases have to show an efficiency exceeding 100 p.ct. It is a pity that such readily demonstrable absurdities should be allowed to have publication from technical meetings.

A correspondent who was interested in our previous comments [June 18, p. 814] has forwarded a comparative statement, showing his consumption of gas when residing in 1920 and 1921 in a district in which 560 B.Th.U. gas is supplied, and in 1922 and 1923 in an area supplied with 280 B.Th.U. gas. When dwelling in the 560 B.Th.U. area, gas was employed for lighting, cooking, a geyser, and an occasional fire; in the 280 B.Th.U. district, all cooking was

done by gas in the summer, but only partly in winter. No geyser or fire was in use. In such circumstances, the volume of gas consumed, one would have imagined, would have been far greater in the 560 B.Th.U. area; but the contrary was the case. Here are the figures:

560 B Th.U. Gas—All Lighting, Cooking, Geyser, and Occasional Fire.

	Lady Day.	Midsummer.	Michaelmas.	Christmas.
1920.	6400	4600	3800	6100
1921.	6300	4400	3800	6200

280 B Th.U. Gas—All Cooking Summer, Part Cooking Winter; No Fire or Geyser.

	Lady Day.	Midsummer.	Michaelmas.	Christmas.
1922.	10,000	7000	7100	9800
1923.	8,800	9100	7900	8900

It will be noticed how uniform was consumption in the respective quarters of the two years 1920 and 1921, with the larger application of gas, and how vagarious it was in the years 1922 and 1923, with the low calorific value gas. It will be further remarked how considerably in excess was the volume consumption of 280 B.Th.U. gas over the 560 B.Th.U. gas, despite the lessened application of the former compared with the latter. What the volume consumption of the 280 B.Th.U. gas would have been had the same amount of work been done as in the case of the 560 B.Th.U. gas, we cannot tell. Apparently it would have been of an immense order. If we turn from volume to thermal consumption, it is seen that in the Lady Day quarter of 1920, 35·84 therms of the 560 B.Th.U. gas were used; while, in the Lady Day quarter of 1922, 28 therms of the 280 B.Th.U. gas were used. Thus the much larger amount of work to which the 560 B.Th.U. gas was applied caused an extra consumption of only 7·84 therms. In the Midsummer quarter of 1923, the volume of 280 B.Th.U. gas consumed was more than twice as much as the consumption in the same quarter of 1921 in the 560 B.Th.U. district—the figures being respectively 9100 c.ft. and 4400 c.ft., and yet the former was for fewer purposes. A somewhat similar tale is told for the Michaelmas quarter of 1921 and 1923. In the quarter of 1921, 3800 c.ft. of 560 B.Th.U. gas were used, while in the 280 B.Th.U. district 7900 c.ft. were consumed in the same quarter of 1923. This consumer's accounts for the four years are a distinct refutation, in his case, of the claim that an equal or smaller volume of low-calorific value gas will do the same amount of work as a higher calorific value gas. It will not. The thermal efficiencies for such gases are approximately the same, given proper regulation, and attention to the details of operation; and therefore the volumes of gas consumed for equal work must have relation to the calorific values.

We are not by any means keen on ultra low-grade gas; but lower-grade gas than is normally supplied is very useful when there is economic advantage in it, and the consumer reaps a substantial share of the benefit. All we are here concerned about is that rash statements at technical meetings or elsewhere in favour of low-grade gas should be avoided—particularly when it can be shown that some of the statements represent a claim to 100 p.ct. efficiency and upwards!

Tarred Roads and Fisheries—Good Testimony.

THE use of tar on road surfaces or in the composition of roads has been charged time and again with the slaughter of fish in streams through the discharge into them o road washings which are supposed to contain poisonous constituents derived from the tar. Where tar is properly applied, the charge remains unproved; and for some time past there have been doubts as to whether incrimination should not be directed elsewhere. Tar has such a large economic value in connection with roads that it would have to be extraordinarily culpable to secure its removal from such service. Practical experience, and that of a comparative nature, must go a long way in exonerating it or in procuring its conviction for wrong-doing. In a letter to the "Fishing Gazette" for Aug. 2, some highly valuable, totally disinterested, and authoritative experience has been supplied by Alderman J. W. Willis-Bund, the Chairman of the Worcestershire County Council, and Chairman of the Severn Fishery Board. The dual position is important in this connection. The Worcestershire County Council have under their jurisdiction over 450 miles of main roads, of which the greater part is tarred, and certain lengths are contiguous to rivers. There can be no question as to the sufficiency of experience with such a mileage of main road.

Consequently Alderman Willis-Bund has been in a position to go fully into the matter as to the effects of road tarring upon fish in rivers; and he is able, in the opening of his letter, to say positively that the Council have not now for some time had any complaints with regard to the destruction of fish by tar. He explains the mode of treating the roads. Dehydrated tar is used, which is applied hot; and immediately after is thoroughly gritted with fine gravel, sand, or crushed slag. The result is that the washings from the roads contain very little (if any) tar; and the Chairman of the Council believes that the injury done to the streams is almost inappreciable. To give an example: There is one length of road which runs parallel to the Teme from Tenbury to Ham Bridge—a distance of about 10 miles. The Teme there is largely fished; and as far as he is aware, no complaints have been made as to fish having been killed by tar. He takes it that this is the result of the way the tar is applied to the roads. A number of other lengths of road in the county could be mentioned; but this one serves as an example.

Now for the contrast, and an indication of culpability in other directions. It follows that if, from many cases of tar dressing in the county, there are no complaints of tar washings killing fish, it cannot be supposed that elsewhere tar dressing *per se* would have the contrary effect. If there were complaints elsewhere, one would naturally examine the conditions relatively to ascertain whether or not there were differences which would account for the opposite experience. There have been complaints in the county as regards other roads. But what is found there?—Heavy traffic, chiefly heavy motors. And Alderman Willis-Bund says there is "no" doubt the fish are poisoned by the washings which come off the road; but he believes this is due not to the tar on the surface of the road, but to the oil, &c., which leaks from the motors, and finds its way into the rivers. This, he remarks, is particularly the case in the manufacturing districts where heavy lorries are more numerous. Thus the Chairman of the County Council is led to think that, where the roads are properly tarred, there is comparatively little injury; but where on the roads there is heavy motor traffic, and the refuse from the motors goes direct into the streams, great damage is done. He does not by any means suggest that tarred roads are *desirable* adjoining trout streams; but his experience induces him to think that there has been much confusion over the question, that there has been too much jumping at the conclusion that tarred roads are responsible, while as a matter of fact harm comes from other foreign matters. It is believed by him that if the opinions were obtained of fishery proprietors in other parts of the country, it would be found that there is something in the points he has raised. The letter is a valuable contribution to this perennially troublesome question.

Wembley.

On the morning of Aug. 12 the registration of visitors at the British Empire Exhibition passed the 10,000,000 figure.

Next Year at Wembley.

It is stated that the authorities at Wembley are arranging to take a census of exhibitors to ascertain how many of them will be prepared to continue their displays next year. It will be mainly on the result of this that the final decision will rest as to the revival of the display in 1925.

Sulphate of Ammonia Prices.

Following our usual reports of "Current Sales of Gas Products" will be found the prices of the British Sulphate of Ammonia Federation, Ltd., for September and October. It will be seen that the prices are advanced to £14 2s. per ton for September delivery, and to £14 4s. for October delivery. These are increases from £14 for July-August, at which price a large quantity has been sold. At the new prices, sulphate of ammonia is still far the cheapest form of nitrogen available.

Inquiries at the Gas Exhibit.

It is interesting to learn from the "Bulletin" of the "B.C.G.A." that the number of recorded inquiries at the Gas Exhibit has now passed the 5000 mark. This, of course, only

refers to those inquirers who have been actually engaged in conversation by the attendants, and who have left their addresses for further information to be supplied. In each case the necessary particulars are referred to the gas undertaking concerned. The number of such inquiries by no means represents the number of people who have visited the exhibit and taken away with them copies of the various descriptive pamphlets. Many people, too, prefer not to leave their addresses, even though detailed information has been supplied to them, so that it may be safely assumed that in a good many cases the seed sown at the Exhibit bears fruit when the inquirer reaches home. A general review of the inquiries received up to the present shows a preponderance in favour of domestic appliances; but a striking feature is the number of requests received for further information regarding smoke abatement and coal conservation—particularly from school teachers.

Carbon Monoxide and Motor Engines.

While carbon monoxide has renewed prominence, through Mr. Butterfield's report on the small effects of its existence in town gas, it may be of interest to point out the dangers of it from motor cars, though perhaps the "Times" and the "Daily Mail" ought not to be allowed to hear of it, or another stupid agitation might be started in their columns. At the Bureau of Mines Experimental Station at Pittsburg, an investigation has been carried out which shows that the air in a garage is unsafe to breathe so long as a motor continues to run. A brick garage was employed with 3000 c.ft. capacity; and in it the engine of a touring car was allowed to run at an "idling speed." A dog was placed on the driver's seat. The doors were closed; and after twenty minutes the dog lost consciousness and fell to the floor of the car. An analysis of the air revealed the presence of 1·3 p.ct. of carbon monoxide. The engine continued to run for two hours, when it stopped for lack of air; at the end of the two hours the percentage of carbon monoxide in the atmosphere was 2·1. The garage was several times as large as a one-car garage, so that it is safe to assume that a dangerous concentration of carbon monoxide would result in the latter in less than half the time recorded in this experiment. A garage in which an engine is running should be well ventilated.

Harnessing the Tide.

The harnessing of the tides for the purpose of generating electricity is an ancient conception, without materialization in this country, other than on a very small scale. Something bigger is now proposed. A contract, it is stated, has been let by the Weaver Tidal Power Syndicate, Ltd., to the Power Construction Company, Ltd., for the construction and installation of a hydro-electric power plant, which is to be erected at West Mersea, Essex, and will be operated by utilizing the rise and fall of the tides. The site has been selected on account of its natural facilities, and also because the neighbouring towns, including Colchester and Southend, will ensure a large demand for the electricity generated. Work has already been started; the first portion of plant being designed to generate over 4 million units per annum. When the entire scheme has been completed, it is estimated that upwards of 15 million units will be produced per annum. This is said to be the first attempt to utilize the tides for the continuous generation of electricity.

The Electrical Wages Dispute.

A genuine desire appears to have been evinced at the end of last week to avoid a rupture between workers and employers in the electricity supply industry. There were further negotiations at the Ministry of Labour on Saturday; and a resolution was mutually passed by both parties, by which the National Joint Industrial Council agree to set up a special conciliation committee, with a Chairman to be appointed by the Ministry of Labour to consider the differences between the two sides, and to make recommendations for consideration by the Council. It was arranged that the Committee should sit on Tuesday, and report to a meeting of the Joint Industrial Council to-day (Wednesday). Meantime, the notices to cease work were postponed. It is understood by both sides that "the difference" means the wages application of the trade union side and the refusal of the employers' side to grant an advance, unless as the result of an arbitration award.

ALDERMAN WEST AND THE LORD MAYORALTY OF MANCHESTER.

Alderman Fred. J. West, C.B.E., M.I.Mech.E., one of the best-known members of the Manchester City Council, and whose activities to bring about the more efficient utilization of coal are common knowledge in the gas industry, is to be nominated Lord Mayor of the city for the next municipal year.

Great energy has always been a dominant characteristic of Alderman West. He was elected to the City Council as a representative of the Newton Heath Ward in February, 1905, since when he has continued to represent it without interruption, both as Councillor and as Alderman, to which status he was elected in 1920. During this time he served on many Committees, including Rivers, Education, Electricity, Improvement and Buildings, and Highways. Besides representing the Corporation on the Upper Mersey Navigation and Mersey and Irwell Joint Committee, and being a Director of the Manchester Ship Canal, he is at present Chairman of the Rivers Committee, and of the Sub-Committee of the Education Committee which controls the Manchester College of Technology. As is well known in the gas industry, he is by profession an engineer, and is a member of the firm of West's Gas Improvement Company, Ltd., whose works are in Miles Platting. His business interests have made him a considerable traveller. In connection with his work, he has visited most of the countries and principal cities of Europe, and on several occasions has been in Canada and the United States.

During the war Alderman West became Chairman of a combination of firms which received contracts for tanks from the Ministry of Munitions, and later was a member of a Government Engineering Commission which visited Germany to examine and report upon the engineering and labour conditions in that country. In 1916 and 1917 he was President of the Manchester Engineering Employers' Association. He is also a Past-President of the Manchester Association of Engineers, and a Past-Chairman of the Society of British Gas Industries. At present he is an active member of the Manchester Engineering Council, a combination of employers and trade unionists, which is doing exceedingly useful work to promote the right relationship between employers and employed.

Realizing that the duties and responsibilities of the civic chair demand the whole time and energy of the occupant, Alderman West has decided to resign temporarily his position with the firm, to enable him to devote his whole time to the duties of the office. The new Lord Mayor will be warmly welcomed in all quarters when he is elected to office in November next, and the gas industry extends its congratulations and good wishes.

PERSONAL.

Mr. W. E. GLADSTONE, Assistant Gas Engineer and Manager to the Colne Corporation, has recently been offered, and has accepted, a position with the Colombo Gas Company, Ceylon, and sails at the end of this month to take up his duties there. Mr. Gladstone entered the service of the Colne Corporation late in 1915, and has taken an active part in the extensions which have been carried out during the last five years.

Mr. F. J. EDMONDS, who for the last five years has been Chief Technical Assistant at the Bishop's Stortford Gas and Electricity Works, has been appointed to the position of Manager of the Waterford Gas Company, in place of the late Mr. P. B. Ellacott.

Mr. HENRY PULLMAN, J.P., who has been a Director of the Hampton Court Gas Company for upwards of 25 years, has been elected Chairman in place of the late Mr. Alfred Goodman. Mr. Pullman has for many years been associated with the gas industry, having occupied the position of Chairman of the Richmond Gas Company for some years prior to the absorption of the undertaking by the Brentford Gas Company. He is also a Director of the British Gas Light, and the Walton-on-Thames and Weybridge Gas Companies.

Sir CHARLES BRIGHT, F.R.S.E., wishes it to be known that he withdrew from the Chairmanship and Board of Sir Charles Bright and Partners, Ltd., in September, 1923, when he ceased to be associated with its activities.

OBITUARY.

It is with regret that we learn of the death of Mr. W. R. Bird, a Director of Messrs. Bird and Son, Ltd., Tar Distillers, of Cardiff. Mr. Bird was the son of the late Mr. R. Bird, founder of the firm, and a brother of Alderman C. H. Bird, J.P., a former Lord Mayor of Cardiff.

Members of the Institution of Civil Engineers.—We have to acknowledge the receipt of the "List of Members of the Institution of Civil Engineers," which has been forwarded by the Secretary. In this new list the addresses are corrected to July 1.

ELECTRICITY SUPPLY MEMORANDA.

GENERALLY speaking, the electrical papers express themselves as pleased that the new wiring rules of the Institution of Electrical Engineers have emerged from their protracted revising treatment.

The Amended Wiring Rules.

We briefly referred to them last week, and have no intention of going into them at length. A point that appears to occasion rejoicing is that the rules as now presented are endorsed by so many different organizations—including the Fire Insurance Offices. But, of course, the compromise there has had to be to effect this has caused certain conditions to be included that are not universally approved, but are accepted as being the best in the circumstances. It is rather striking that there is little or no visible criticism of these matters. Perhaps it is thought preferable to let them alone rather than to raise controversy. In all there are 128 regulations and 15 sets of tables, and the pages occupied are 124. This shows that approved electrical equipment is a work of art, with a big range in diversity of parts, and that a good span in the life of an electrician must be devoted to the attaining of a thorough knowledge of those things which he must do, and those things which he must not do, in order to satisfy the laws laid down by the powers that be. All these rules are necessary to realizing the greatest safety to person and property and the highest working efficiency and economy. Yet all that has been done hitherto has not invested electricity with impeccancy.

A Few Points.

Our friend the "Electrical Review" has given a fairly long article on the revised and amplified regulations. From this a few points are taken. It is stated that wood casing is still permitted in dry situations, and circuit wiring (on low-pressure subcircuits only) may be run with flexible cords on china cleats. A particularly interesting point is that a ventilating outlet is to be provided at the highest and lowest points on each circuit in a conduit installation. The "Review" asks two questions on this: "Will the rule be kept?" "Is it desirable?" Its comment is: "Normal circulation of air in a metal conduit does not mean a drying current, but a condensation of replenished moisture." We would add another point. Is air circulation wise in a metal conduit system in which there is moisture? The circulation of air will give a constant supply of oxygen; and, with the moisture, we see excellent provision for promoting rapid oxidation. We suggest that the passage of air (containing oxygen) through a metal conduit is something to be avoided rather than facilitated. The "Review" also states that the rules "wisely" specify that all heating and cooking appliances "shall" be provided with a terminal to which an earthing lead "may" be connected. The definite injunction as to the provision to be made is worthless if in the end completion is merely optional. Consumers who are not likely to see the rules—and electrical people will take care they do not, as there is no desire on their part to frighten them with the dangers of electricity—are "reminded" of the importance of keeping all appliances clean and dry, and of the value of systematic inspection. The suppliers of electricity have complete cognizance of the value of inspection of electric appliances for cooking and heating, as they know how prone they are to get out of order, and to cause trouble and dissatisfaction. It ought not to be necessary, but apparently it is, to remind electricians, in respect of additions to a house system, that it is essential to ascertain the capacity of the existing system before the current is augmented. The amending of the rules is a good work finished, until it is found by experience that further revision is needed. The question is: Will the rules be observed, and will future installations be free from the uncomfortable troubles experienced during the reign of the regulations which have now been superseded?

Small Dwellings and the Old Story.

Where small dwellings are supplied at a fixed rate—and a rate above which it is not possible to go, and retain the custom—history shows that, as a general rule, the absorption of current by the consumers gradually becomes more and more, and then the system gradually recedes from the paying point. The St. Pancras Electricity Committee entered into a substantial experiment, and history has apparently repeated itself; so much so that on another estate—the Brookfield—instructions have been given for some slot meters to be installed "as an experiment." This being so, we take it the dwellings scheme for which the financial results are just published was conducted on the fixed price principle. The statement of expenditure and income for the year shows that the value of the current consumed (calculated at 5d. and 4½d. per unit) amounted to £3082 10s. 9d. Adding to this the cost of maintenance and interest on loans, and capital charges peculiar to the scheme, make a total expenditure of £4630 14s. As against this the income from rentals is £4400 2s. 7d.; and £80 17s. was received from the sale of lamps. The result is a loss on working of £149 14s. 5d. The amount received from rentals the previous year was £3190, so that the rental last year increased by 37·5 p.ct. But the consumption of current advanced by 75·3 p.ct. Had the consumption increased in the same ratio as the rental, it is said the loss would have been converted into a substantial profit. There are at present 1063 consumers under the scheme. We should like to have an opportunity of examining critically the financial statement—from capital expenditure onwards—with full details. The published result itself shows the risky character of this class of business. The farther an undertaking goes into it, the more speculative it becomes. If there is nothing more than a positive net loss of £149 14s. 5d. (does this include all clerical and other charges?), the ratepayers and the electricity consumers are to be congratulated. However, the Committee state that they have given the matter very careful consideration; and, in view of the position disclosed, they are unable to recommend the Borough Council to make at the present time any general reduction in the prices charged for supplies under the scheme. There might have been some question as to their administrative competence had they come to any other decision. Some people may think that the Committee ought to be censured for having embarked on the scheme at all. We are not so sure about that. Electrical people rarely accept the experiences obtained elsewhere. However bad those experiences may have been, they generally want to try the same thing themselves in their own circumstances, even if they get bitten. Anyway, the next experiment of St. Pancras on another estate is to be with slot meters, so as to ensure that all the current consumed is paid for.

Charges for "Other Purposes."

The bi-part system of charging for electricity—that is to say, a lump sum down, and a low rate per unit for the electricity consumed, no matter the purpose, has been designed mainly with the object of obviating the installation of a second electrical wiring system and meter for purposes other than lighting, so saving the expenditure involved, which, of course, would fall upon the consumer. There are in existence many wiring installations which would not be sufficient for anything more than the lighting, and in such cases it would be almost as good to put in a second installation for heating and other purposes as to rewire the house suitably for all purposes. But there is another point of view; and it is that of the consumers. It is an open question whether it would not pay them equally well to put in the second installation and have lighting and heating current on separate flat rates or, if the existing installation is adequate, at a uniform low flat rate. Either way, given respectable working efficiency, the low rate for heating purposes would attract attention, and possibly custom. The matter has been brought to the front by correspondence in the "Electrical Review" on hindrances to electrical development. One correspondent states: "If a consumer is really anxious to use electricity for purposes other than lighting, the cost of an extra circuit would not prevent him taking advantage of a cheap heating rate through a separate meter." Another correspondent, Mr. W. G. Brown, develops this opinion. He remarks that the class of business the electrical industry is after is in connection with the individual who is *not* really anxious about anything electrical; and it is to this class that efforts must be directed. It may be assumed that, generally speaking, the rate for heating purposes is much lower than that for lighting. This, of course, involves separate circuits, meters, &c. In many districts the maximum demand method is adopted for lighting, and a flat rate for heating; and great has been the surprise of unwary consumers on the receipt of the account for energy the month following the use of an electric iron or kettle, plugged from the lighting circuit as advised by the appliance manufacturers. The demand indicated by even an electric iron often exceeds the whole lighting demand; and when used in addition to the lighting, the demand is more than doubled—perhaps for one hour's use per week. What is the remedy? A separate circuit with a separate meter, with wiring costs and meter rent for one flat iron? One would answer "No" if the additional circuit was only required for a flat iron; if for other purposes, it might pay in the long run to have it. Mr. Brown, with the separate circuit for one flat iron in his mind, remarks that no wonder the electrical industry is experiencing some difficulty in bringing these very real conveniences to the full use to which they are properly entitled. Mr. Brown evidently likes our system. Our gas friends, he observes, supply gas to stoves and lighting through one meter at a flat rate. This he opines is a method of charging that must be made optional to every consumer of energy for domestic purposes, with a possible limit of (say) 2 KW. Finally, he says it is somewhat deplorable that the method of converting electrical energy to heat for domestic and other purposes is essentially the same as thirty years ago. Had electric heating apparatus the same efficiency as lighting, there would be, he thinks, no need to direct efforts to convincing the sceptical.

Loose Statements.

A Mr. L. F. Ryland, in the same issue of our contemporary, categorically states that at the price of 8½d. per therm for gas and 1d. per KW.-H. for electricity, it is as cheap to cook by the latter as by the former. We have lately been told what has long been known, that about 80 p.ct of the cooking (whether performed by an electric or a gas cooker) is done on the hotplate. It has recently been mentioned, too—a fact which is also well known by gas undertakings—that where electric cookers have been installed, there gas rings are frequently introduced or reintroduced to relieve of part of her (or his) misery the user of the electric

cooker. A therm contains 100,000 B.Th.U.; and 8½d. worth of electricity at 1d. per KW.-H. would represent 29,070 B.Th.U. If the over-all efficiency of electric cooking was 100 p.ct., then the over-all efficiency of gas would have to be 29 p.ct. to obtain parity. As a matter of fact, 60 to 70 p.ct. efficiency can be secured with present-day boiling-rings; and 80 p.ct of the cooking is done on the hotplates! The over-all efficiency of the electric cooker approaches nearer 29 p.ct. than is the case with the gas cooker. If the electric cooker has parity with gas in regard to cost, then the efficiency of the gas cooker must be far advanced on the road to *nil*. Fabrication and nonsense are found in many of the claims put forward by electricians. How they must be laughed at by those who know better! Mr. Ryland may be advised to revise his notions.

A Reminder for "Meteor."

May we remind "Meteor" of the "Electrical Times" that he has not yet replied to the article in the "JOURNAL" for July 30 [p. 443], headed "Electrical Omissions in Comparisons." Fair play demands an answer.

Registered Contractors.

The voluntary registration of electrical contractors has made a start; and up to June 30 some 500 firms have been enrolled. But this must be quite a small proportion of the total in the country. The idea is to exclude the incompetent from registration; and therefore the Committee who have been entrusted with the delicate task of sifting the good from the bad have had to exercise the utmost care. We wonder what would happen if a fully competent contractor was unwittingly, or for any other reason, denied inclusion. Would he be able to take proceedings against the Committee? Application having been made, exclusion would certainly reflect upon him, and perhaps be damaging to him in his business. There is no doubt the register will be found useful; but as yet it is very remote from being comprehensive. So far as it goes, it should be of value to consulting engineers, architects, and builders. There is to be annual revision. Another matter as delicate as that of declining to enrol an applicant is that, for investigating complaints against any registered firm, machinery has been established; and if the firm is found blameworthy, "the penalty is cancellation of the certificate, and removal of the name from the list." Again there would have to be no room for doubt, or trouble of an unpleasant character might follow. Of course, unless the register is quickly amplified and made more representative, its value will be largely discounted. A good reputation is more valuable than registration.

The Way of Labour.

The London Labour Party must be a severely communistic body, judging from a resolution they have drafted for consideration at the annual conference of the National Labour Party which is to be held in October. The resolution avows that it is of vital importance, in the interests of British industry and agriculture and housewives, that general legislation on electricity should be introduced by the Government, and that in the meantime private legislation, which [the authors must have chuckled over this] is calculated to strengthen the grip of private monopoly in this important and growing industry, should be rejected. The London Labour Party should make sure of their ground; they advance no argument or proof that what they advocate would be in the interests of anyone. They leave no room for doubt as to what they want in respect of electricity. It is proposed to present the Government with two alternative lines of policy, with a request that they adopt one or other of them. The first proposal is: The partial or complete nationalization of the generating side of the electricity industry, coupled with municipal distribution. The second proposal is legislation strengthening, from the point of view of public ownership and control, the existing electricity statutes, and incorporating the following points: (1) The compulsory appointment on definite lines of a joint electricity authority for delimited areas, with a preponderance of public representatives. (2) A statutory obligation to be imposed on a joint electricity authority to carry out an approved technical development of electrical supply. (3) The immediate compulsory acquisition by the joint electricity authority of all electricity undertakings, municipal or company, at cost, less depreciation; the same principle of compensation being applied to all classes of undertakings, including power companies. (4) Instruction to the joint electricity authority, wherever practicable consistent with efficiency, to arrange with a local authority to act in its own area for the joint authority in the matters of distribution. (5) The raising of necessary capital (wherever considered advantageous) by State methods to meet capital expenditure by each joint electricity authority. We have not observed any quaking in the electricity industry since the publication of this proclamation as to Labour's electrical policy.

Carbon Monoxide in Public Gas Supplies.—Copies of the report by Mr. W. J. A. Butterfield, M.A., F.I.C., one of the Gas Referees, can be obtained at any one of H.M. Stationery Offices (for example, Imperial House, Kingsway, W.C. 2). The price is 2s. 6d., *plus* postage.

NOTTINGHAM GAS UNDERTAKING.

A Memorable Jubilee Record.

In the history of the British gas industry no more striking record of successful results of municipal control is to be found than in that supplied by the Nottingham undertaking, the jubilee of the acquisition of which by the city authorities was commemorated on Thursday last. The metropolis of the lace and hosiery industries is in the gratifying position of having within its administrative control all the chief public trading concerns, including tramways and water and electricity supplies; but in regard to none of these has the progress achieved been more significantly consistent than in connection with the works which are responsible for furnishing the main illumination and motive power in an area that extends far beyond the confines of the municipal territory. Notable developments have enabled substantial aid to be afforded in relief of rates. In consonance with sound financial policy, the building-up of adequate reserves has also been assiduously fostered, while solicitude for the interests of consumers has been exemplified by many material reductions in charges, by which manufacturers and residential customers have been alike benefited. The progress has been coincident with an era of the city's greatest expansion; the record which the jubilee celebration recalls affording abundant evidence that no more profitable enterprise was essayed than when, in the interests of the general body of ratepayers, on Aug. 14, 1874, the works were acquired on behalf of the municipality from the private company to whom their inception early in the nineteenth century was due. Nottingham was one of the earliest among the large provincial centres to recognize the value of the first practical application, made by Murdoch at Birmingham in 1802, of coal gas as an illuminating medium; and from modest beginnings the undertaking, *pari passu* with the city's growth, has risen to establish a record for financial results. Thus, while ratepayers have been materially benefited, dwellers in extra-municipal areas which are mainly dependent upon Nottingham's enterprise in regard to indispensable public services have also received a substantial measure of advantage, affording, with other considerations, an incontestable argument in favour of a wide extension of the city boundaries, which, it has been suggested, cannot be much longer delayed.

FOUR STAGES IN THE HISTORY OF THE UNDERTAKING.

Four main epochs may be cited in the history of the undertaking, commencing with the establishment, in 1818, of works in the southern part of the city, on land known as Butcher's Close, and their subsequent extension to Island Street—both these sites being now occupied by buildings forming part of the chemical works of Messrs. Boots Manufacturing Company. In 1844 the construction of the Radford Gas-Works was effected, and it was there that in 1913 the city's first setting of verticals, of the Glover-West type, was installed; this branch of the city's resources having been specially utilized with admirable results during the war period, for meeting essential needs. But the most notable phase in the development of the undertaking, which was afterwards to be extended under municipal ownership, was reached in 1854, when the construction of the Basford Gas-Works was effected by the then proprietary company; it being there that the largest carbonizing operations have been since carried on, leading to the installation in 1916-17 of verticals of the Woodall-Duckham type. Construction of new works at Eastcroft, in 1857, forms a fourth important stage in the history of the undertaking, to which has been added chemical plant at Giltbrook and Basford for the working-up of the various products derived from the carbonization of coal, together with the manufacture of sulphuric acid. In regard to all these matters the policy has been one of constant progress; it being significant of the responsible Committee's solicitude for promoting the efficiency of the works at all points that, before the installation of vertical retorts was decided upon, visits had been paid to many of the chief gas-works on the Continent, with the result that sound data were acquired.

THE ORIGINAL COMPANY.

It is of considerable interest at this juncture to recall that the first artificial lighting in Nottingham dates back to 1762, in the reign of George III., when an Act was obtained for "an enlightening of the streets, lanes, and passages within the town;" the carrying-out of this measure being delegated to a Lighting Committee elected by the inhabitants rated at £5 or upwards per annum. This occurred practically 40 years before the introduction into this country of coal gas for illuminating purposes. The Company which was afterwards created for the purpose of undertaking Nottingham's supply obtained its first Parliamentary Act on May 8, 1818, its powers being extended under various later measures, in connection with which it is instructive to note that for a considerable period there were no restrictions imposed in respect of price, quality, or pressure. The venture was incorporated under the title of the "Nottingham Gas Light and Coke Company;" it being established for the purpose of "procuring inflammable air, coke, oil, tar, pitch, asphaltum, ammoniacal liquors, and essential oil from coal." The area of supply was then restricted to the town of Nottingham, the population of which at that time was estimated at 40,000. The share capital of the Company was limited to £16,000; the Company being authorized to borrow a sum not exceeding £5000. It was further

stipulated by the Act that the share capital was to be raised within five years, and that such share capital, of £16,000, was to be divided into shares of £50 each. The rate of dividend payable on the share capital was to be limited to £5 per annum per £50 share, equal to 10 p.ct., and power was given to allocate to a reserve fund any excess of profits; the reserve fund being limited, however, to £4000, and being specially designed to make good any deficiency which might occur from time to time. The management was entrusted to a committee consisting of nine members of the Company who had subscribed for, or had been in possession of, not less than two shares in the undertaking for a longer period than two calendar months. Under the powers thus acquired, the construction of the first works was proceeded with on the site of a cotton mill in Butcher's Close, it being interesting to recall that the consulting engineer at that time was Mr. Thomas Livesey, who was for many years Deputy Governor of the Gas Light and Coke Company. Thus in relation to the Nottingham undertaking there was invaluable professional advice available in the incipient stages; and it was in fitting sequence to this early experience that the Corporation had the advantage of securing the benefit of the services as resident engineers of men who have played no inconspicuous part in the general evolution of the gas industry. In that association of ideas, and in no sense of invidious distinction, the name of one who has now long occupied the position, Mr. John Wilkinson, calls for special mention, inasmuch it has been under his discriminating guidance as Engineer and General Manager that the most substantial results, to the city's great advantage, have been attained.

A Record of Great Progress.

Pursuing the historical record, but with inevitable excisions of many interesting local details by reason of exigencies of space, it may be mentioned that gas was first brought into use in Nottingham on the evening of April 13, 1819; the total output for the year being approximately 7 million c.ft. The stupendous increase which has occurred in the intervening period is indicated by the fact that for the year ended March last 2,658,667,000 c.ft. were made, equivalent to 12,628,668 therms. The price charged in 1819 was 12s. per 1000 c.ft., compared with an average of 3s. 5·43d., or 8·72d. per therm, for the annual term ended March last. But in 1819 the rate had to be assumed, as no meters were then in use; the actual charges, payable in advance, being computed upon a pre-arranged scale of hours of lighting. There were many Acts of Parliament obtained from time to time by the old private Company, by means of which its capital powers were necessarily largely amplified, to keep pace with increasing expenditure upon new works and the extension of supply to places contiguous to the city, which were comparatively small rural centres, but many of which have since grown into substantial townships. Under the ægis of the original Company, there arose in relation to its last application, in 1864, for a further extension of its area of supply, the fear that it might result, if Parliamentary sanction were granted, in higher charges being imposed for gas supplied in Nottingham, with the result that the Corporation and the General Lighting Committee strenuously opposed the extension. After protracted inquiry, the Company succeeded in relation to its application for an enlarged sphere of operations, though not so completely in regard to its request to be granted additional control of public lighting. Authority was given to charge differential prices for gas supplied in the new districts, but such additional charge was not in any case to exceed 1s. per 1000 c.ft. The then Engineer of the Gas Company was Mr. Thomas Hawksley, who was born at Arnold, in the immediate neighbourhood of Nottingham, and eventually established an extensive practice at Westminster as a Consulting Engineer.

Acquisition by the Corporation.

It had long become obvious in Nottingham that private exploitation in relation to an essential branch of public service could no longer be tolerated, and the Corporation experienced no difficulty in acquiring the undertaking upon terms which secured an equitable return to those who held shares in the Company. The Act was passed on July 16, 1874. The actual date of the transfer was Aug. 14, and the proceedings commemorative of the jubilee of the acquisition were entered on last Thursday. The programme included visits to the Radford and Basford Gas-Works, followed by luncheon at the Exchange Hall, where in the evening of the same day the first of a series of dinners to employees engaged in various sections of the undertaking was given; similar festivities being continued on the two following evenings, with a concluding dinner on Monday. The parties who were so entertained aggregated 897 men, many of whom had grown grey in the service; the guests including no fewer than 44 pensioners, whose work has not been allowed to pass without practical recognition. Apart from the opportunity which those visiting the works at Radford and Basford were afforded on Thursday of inspecting mechanical features of interest, the jubilee suggested reflection on the results of Nottingham's most important branch of civic enterprise. Gross profits which amounted in 1875 to £34 378 had risen in the year ended March last to £165,502; the record under this head being established in the immediately preceding annual period, when the total gross profit aggregated £181,367. The daily producing capacity of the works is 14 million c.ft., or 98 millions per week; the total storage capacity at the three carbonizing stations—Eastcroft, Radford, and Basford—being 9,170,000 c.ft. The maximum daily sale up to the present is 10,804,000 c.ft., on Dec. 21, 1923, and the maximum week's sale has been 68,934,000 c.ft., for the week ended Dec. 22 of that year. The total area of the districts now supplied with gas is 138 square miles. There are many men who, in rendering conspicuously valuable service in Nottingham municipal affairs, have been associated with the administrative control of the gas undertaking, and among them the present Chairman of the Gas Committee, Alderman Sir Albert Ball, occupies a distinctive place, by reason of the unswerving solicitude which he has manifested, during a long period, for the success of the City's most remunerative and efficiently conducted trading concern.

[Our report of the luncheon on Thursday last and other events in connection with the jubilee celebrations will appear in next week's issue.]

CARBON MONOXIDE IN PUBLIC GAS SUPPLIES.

Mr. W. J. A. Butterfield's Report.

(*Concluded from p.* 589)

Accidents in Towns with High Death Rates.

An account of circumstances attending fatal accidents in certain districts having a much higher death rate than others supplied with gas containing substantially the same proportion of carbon monoxide is followed by the observation that the death rate from accidental gas poisoning varies greatly in different urban districts, and seems to be determined by factors which are difficult to discern in all cases, but which appear to have little or no connection with the proportion of carbon monoxide in the gas supplied.

With very few exceptions, the areas in which the death-rate is much higher than the average are towns on the coast, some being ports and some mainly residential. It is likely that the higher proportion of accidents is to some extent caused by the itinerant character of a considerable part of the population of such towns, and unfamiliarity of some of the strangers either with gas at all or with the particular type of gas fittings or appliances of which they are there given the use; while the very dangerous practice followed in some boarding and apartment houses of turning-off the gas at the meter about midnight, and turning it on again in the early morning before most of the inmates are awake, contributes to the chances of poisoning in bedrooms. These reasons do not, however, in themselves afford an adequate explanation of the whole of the generally greater incidence of gas poisoning fatalities in coast towns, and it may be surmised from a study of the reports that the salt-laden atmosphere causes more rapid corrosion and failure of brass tubing, fittings, &c., than occurs in most other towns. On this account, periodical overhaul, repair, and renewal of gas piping and fittings appear to be called for in coast towns more urgently than elsewhere. The west and south coast towns have a higher death-rate than the east coast towns, which is in keeping with the suggestion that salt-laden air from the sea is instrumental in producing leakages of gas, seeing that south-west winds prevail in this country.

The fact that in both the large and the medium-sized coast towns the death-rate from accidental gas poisoning is approximately twice as high as in the inland towns of the same size, certainly suggests that proximity to the coast should in itself be held to warrant the adoption of whatever measures can be shown to minimize the risk to consumers of escapes of gas.

Apart from the special case of coast towns, the chief factors by which the death-rate from accidental gas poisoning is controlled in the large towns appear to be in fact the condition of the gas piping, fittings, &c., in the premises supplied, and the relative proportion of prepayment to other meters. The last-named factor is, however, in one respect only a particular phase of the first, as it will be found that the comparative immunity of premises supplied through prepayment meters from risks of accidental gas poisoning depends to a considerable extent on the general maintenance in good order of the piping and fittings by the gas undertakings, who, with some exceptions in the North of England, make themselves responsible for the regular inspection, overhaul, and maintenance of prepayment installations.

Mr. Butterfield next discusses the circumstances of fatal accidents, fallacious assumptions regarding accidental fatalities from gas poisoning, the manner of occurrence of fatal accidents from escapes of gas, and escapes of gas from street mains. An attempt has been made to trace all cases of death due to poisoning by gas escaping from street mains during the 10¾ years to Sept. 30 last. The number is 23 separate escapes, with an aggregate of 38 deaths. These fatalities therefore form about 5 p.ct. of the total number of accidental deaths from gas poisoning in the period, and average about 4 per annum in relation to the total population—*i.e.*, 25 to 30 million persons—of all districts in England and Wales which have public gas supplies. Of the 31 deaths caused by gas other than ordinary coal gas, there are not more than 10 in which there seems to be any possibility that the lives would have been saved if the gas had contained no more carbon monoxide than coal gas; and it is very doubtful if in these 10 cases the excess of carbon monoxide really affected the issue.

Prepayment Meter Supplies.

Mr. Butterfield states that fully 95 p.ct. of the accidental deaths from gas poisoning arise from leaks or escapes from pipes, fittings, or appliances on the consumers' premises. In the twenty-one months from January, 1922, to September, 1923, there were 156 accidental deaths ascribed to poisoning by gas from 135 separate cases of escapes on consumers' premises in England and Wales; and apparently only about 27 p.ct. of all the cases or deaths occurred through prepayment supplies. On the other hand, at the end of 1922 there were 3,855,021 premises—or 55·85 p.ct. of the total number supplied by authorized gas undertakings—fur-

nished with gas through prepayment meters. In the twenty-one months already alluded to, accidental deaths on prepayment meter supplies throughout the country averaged one per annum per 157,000 premises supplied through such meters, or (say) one per annum for over 600,000 persons who used gas through such supplies. "It is evident from these figures that gas supply through prepayment meters affords a measure of safety from risk of gas poisoning which almost passes belief. It would be difficult to suggest any other public service which is so free from danger to those who avail themselves of it, as well as to the public at large. With so extremely low an accidental death rate, it is clear that the supply of gas through prepayment meters affords little scope for any reduction in the risk of poisoning."

He then proceeds to study the circumstances of the cases, in order to ascertain on what factors this high degree of safety chiefly depends. There is no doubt in Mr. Butterfield's mind that the immunity arises chiefly from two causes: (1) The cessation of supply, after a volume of gas corresponding to the coins already inserted has been delivered, such volume being often insufficient to produce a lethal atmosphere in the room into which the gas penetrates; and (2) the relatively sound condition of the piping and fittings used in connection with prepayment meter supplies. The majority of prepayment meter supplies have been put in within the last 25 years, and the piping and fittings are comparatively new. Moreover, they are usually the property of the gas undertaking, are of good workmanship, and are maintained and periodically inspected and overhauled by the gas undertaking. There is no case reported in which there is evidence of negligence in this respect on the part of a gas undertaking.

It appears that in certain towns, mostly in the Midlands and North, it is the practice of builders and landlords to put in the pipings and fittings even for prepayment meter supplies, and the gas undertaking has no responsibility in regard to the quality of the work or the subsequent maintenance of it in good order. There can be no question that arrangements should be made for the gas undertaking (or the local authority) to supervise the provision of gas piping and fittings in such cases, to make periodical inspections of the same, and to prevent a supply of gas being given when it would be dangerous owing to the bad state of the piping and fittings. The towns in which the latter are not already provided and maintained by the gas undertaking in connection with all prepayment supplies are chiefly, if not entirely, places in which the gas undertaking is owned by the local authority.

Ordinary Meters.

Turning to ordinary meter supplies, Mr. Butterfield says:

The 98 cases, involving 113 deaths, which occurred in the twenty-one months ended Sept. 30 last, on supplies definitely stated, or believed to be, through ordinary unlimited-supply meters, may be classified as follows:

	Cases.	Deaths.
Suicide strongly suspected	14	15
Suicide not improbable	2	2
Dubious cases of gas poisoning; the victims being subject to fits and having sustained a blow in falling. At most, "accelerated by gas poisoning"	6	6
Probably due to products of combustion, and therefore quite independent of the carbon monoxide content of the gas supplied	10	15
Escapes from lighting burners	21	23
Escapes from fires, ovens, boiling rings, geysers, split pipes, open ends, &c.	45	52
	98	113

Of the whole number, including the probable suicides, 32 cases (= 35 deaths) occurred in the daytime when the victims were not asleep, and 66 cases (= 78 deaths) occurred at night-time or when the victims were asleep. These figures are significant, because in the past it has been generally assumed that practically all the accidents happen in bedrooms —*i. e.*, when the victims are asleep. The figures disclose the fact, however, that about one-third of the cases of accidental gas poisoning occur to persons who are not sleeping at the time.

Of the whole number, it is known that piping, fittings, or appliances were defective or out of order in 66 cases (= 80 deaths), and that the defects were responsible for, or contributory to, the accident. The remaining 32 cases (= 33 deaths) include nearly all the suspected suicides, so that the number of indubitable accidents for which defective piping, fittings, or appliances were not more or less responsible becomes only about 20 p.ct. of the whole. Such accidents include several altogether abnormal cases.

It is noteworthy that, as in the case of prepayment meter supplies, a very large proportion of the accidents are caused by persons greatly enfeebled by old age or ill-health. Of the 39 deaths through ordinary meter supplies in the first nine months of 1923, eleven were of persons over 65 years of age, and ten others of persons not in full possession of their faculties at the time.

After investigating the circumstances of all the cases, Mr. Butterfield says it appears that—

Whereas prohibition of the use of water gas entirely throughout the country might reduce the fatalities from accidental escapes through ordinary meter supplies by about 15 p.ct., or at most by 20 p.ct., the provision of sound piping, fittings, and good appliances, and proper supervision and maintenance of them, would be likely to reduce the fatalities by at least 50 p.ct.—perhaps by as much as 60 p.ct.—which would include at least two-thirds of the 15 or 20 p.ct. that might possibly be avoided by the universal reversion to coal gas alone. Periodical overhaul of piping, fittings, and appliances would have the further advantage of improving the efficiency of the service rendered by gas, since a large proportion of complaints of "bad gas" are in reality due to defects in burners, &c. There is a residue of 30 to 40 p.ct. of the total "accidents" (some of which are undoubtedly suicide), in which no measures that could be taken by or imposed upon gas undertakings would appear able to effect any reduction.

Mr. Butterfield is of opinion that the direction in which a given outlay or effort will achieve the greatest result is in proper maintenance of piping, fittings, and appliances in dwelling houses supplied through ordinary meters. The most urgent cases are the majority of the coast towns, in which, as a whole, the death rate from accidental gas poisoning is twice as high as in inland towns of the same size. It is very undesirable that any charge should be made for individual inspections, as some occupiers would then refuse to permit them; the cost should be distributed among the consumers—perhaps most suitably, generally, by an addition to the meter rent. In cases where this method would be inapplicable, the cost may have to be merged in the general expenditure of the outdoor staff of the undertaking. This appears to be the procedure of the few undertakings that have already adopted a fairly complete system of inspection. Certificates of soundness given by authorized gasfitters, &c., might be accepted by the gas undertaking; and in case of necessity undertakings might be given power to make compulsory inspections or to refuse to supply by ordinary meter.

The inspection should be repeated at every dwelling house at intervals of not more than three years, but obviously subsequent inspections would be made more expeditiously than the first. It is very desirable that the first inspection should be made without delay in all dwelling houses supplied with gas in coast towns, and in other places which may be named by the Board of Trade from information at their disposal. In such towns, the first inspection should be completed by March 31, 1925. It is, of course, very desirable that other gas undertakings besides those named should institute a similar inspection.

In due course all the larger gas undertakings, as well as such of the smaller undertakings as appear to the Board of Trade to be operating in conditions which have proved or are likely to prove specially risky, should be required to adopt such a scheme of inspection. In certain cases, it may be desirable to extend it to other premises besides dwelling houses, but the latter should certainly be dealt with first.

Adequacy of Protection Through Control of Fittings, &c.

The report concludes with some remarks by Mr. Butterfield on the adequacy of protection through control of fittings, &c. He points out that no prohibition of the supply of gas which is poisonous will remove entirely the risk of accidental death; the most it could do, as far as available information shows, is to reduce it by about 20 p.ct.

There is, on the other hand, good reason to believe that the maintenance of all piping, fittings, &c., in good order and sound condition will reduce the risk by nearly 60 p.ct. Further that such maintenance will cost consumers as a whole much less than the observance by the gas undertaking of drastic regulations as to the toxic character of the gas supplied. It should be remembered that in the case of electricity supplies, safety of life and property from risk of fire depends absolutely on the proper observance of regulations issued by the fire insurance offices for the wiring of premises.

No corresponding regulations have ever been suggested in the case of internal gas piping, &c., because the inherent fire-risks are so much less with gas than with electricity or any other lighting agent. But if it is safe for the public to rest its security against fire on the observance by electricians of regulations for wiring laid down by an outside body, it is equally safe for the public to rest its security against gas poisoning on the observance of proper precautions in the piping and fitting of houses for gas supply.

The Swiss Gas Association.

The July number of the "Bull. Mens. de la S. Suisse Gaz et Eaux" announces the programme to be carried out at their 51st Annual General Meeting which is to be held at Thun on Sept. 6, 7, and 8. The usual reports of commissions will be presented, and among subjects to be dealt with in technical papers are propaganda and the dry quenching of coke. An official banquet is to be held, and the celebrations will wind up on Sept. 8 with an excursion to Lake Oeschinen.

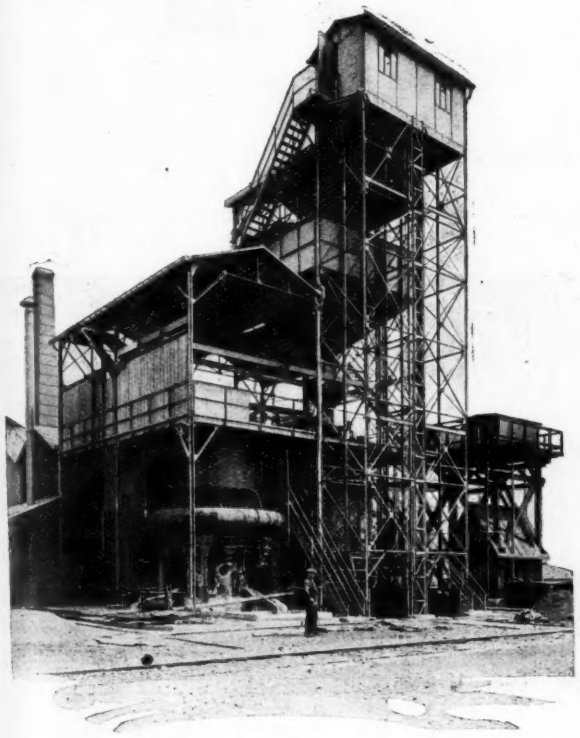
A Gas Tank Built by Nature.—Nature supplies both the gas and the holder in a remarkable structure near Springfield, N.Y., 25 miles south of Buffalo, says the Pennsylvania Public Service Information Committee. The "tank" resembles a gigantic sponge in a glass jar. A great number of small connected underground cavities, enclosed in a shell of impervious stone, make up this natural gasholder, which has a capacity twenty times as great as any man-made holder. The natural tank will hold more than 400,000,000 c.ft. of gas. Originally at the centre of the Zoar natural gas field, now depleted, the tank is used as a holder for gas from other wells. The natural gas is pumped in during the summer, for use in the winter, when the demand exceeds the supply. The Zoar field was first developed in 1907. By 1918 the supplies of natural gas had decreased below the point of usefulness; and as an experiment, 45,000,000 c.ft. of gas from other wells was pumped in. During the following winter the gas was pumped out, and the meter measurements showed that none had been lost. Since then as much as 350,000,000 c.ft. at one time has been stored in this unique holder.

"LA VILLETTE" WORKS OF THE SOCIÉTÉ DU GAZ DE PARIS.

[From a brochure distributed at the visit during the Centenary Celebrations.]

The "Institution Number" of the "JOURNAL" (July 2) contained on p. 189 a short reference to this station of the Société du Gaz de Paris. We then promised a translation of the admirable brochure distributed among the many visitors who were entertained by the Company on June 28; and the hope was expressed that we might be enabled to include detailed carbonizing results of the large chamber-oven plant at La Villette. Through the absence on leave of the Chief Engineer, M. Henri Laurain, we have not yet secured these figures; but the brochure contains much of interest, and the blocks for the illustrations have been kindly lent us by the Company.

La Villette is described in the book as a group of works covering more than 81 acres in the north-eastern district of Paris. It is bounded on the east by the St. Denis Canal, and served by the Eastern main line and the suburban network. It is interesting to note that the gas-works, which were built by the old Paris Company in 1856, were the first in France to treat tar for its



Producer Test Plant at Landy.

many derivatives. A broad scheme of modernization and enlargement was interfered with by the war; and it was only during the early part of this year that the starting-up of the water-gas plant marked the completion of the project.

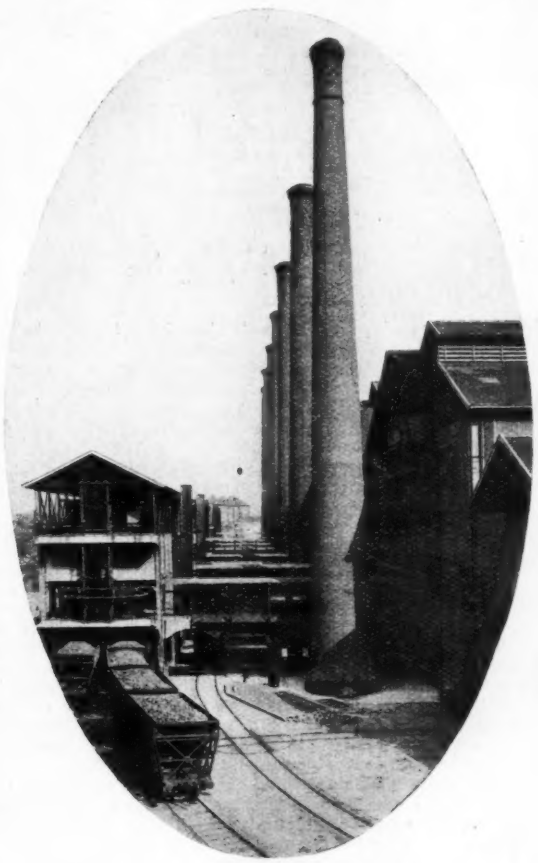
COAL HANDLING.

The gas-works themselves actually cover some 32 acres, while 9 miles of railway track within these bounds make communication with main-line and canal transport an easy matter. River-borne coal is unloaded by two electric grabbing cranes which place it in hoppers near-by; and these in turn feed the coal on to a system of belts and conveyors which charge six main "reserve" hoppers at one end of the "coal viaduct"—raised and covered sidings which run the whole length of the carbonizing plant. Thence the coal is fed into what are called "universal" trucks for distribution. In this way 150 tonnes an hour can be dealt with.

For transporting coal from the mines or from the port of Rouen, the Gaz de Paris employ high-capacity bogey wagons of 40 tonnes capacity, discharging through six side and four bottom doors; and the Company have five Fives-Lille locomotives at work at La Villette. Coal trucks coming from the "reserve" hoppers or from external sources are discharged on the viaduct; the coal gravitating to a pit at a lower level, whence it is picked up by a gantry crane of 63·4 m. span and 60 tonnes an hour capacity, and either heaped in the yard or fed into the "universal" trucks for distribution. Coal for immediate carbonization is emptied into three batteries of 36 60-tonne hoppers situated in rows underneath the three lines on the viaduct; their capacity being 6480 tonnes while that of the whole works totals 55,000 tonnes—sufficient for 40 days' throughput. A system of longitudinal and transverse belts conveys the coal from the hopper batteries to Dalbouze breakers, two for each house, which reduce it to 75 mm. maximum size. Hunt conveyors (duplicated) then raise it to hoppers at the top of the houses, whence push-plate conveyors distribute it throughout the settings.

CHAMBER OVENS.

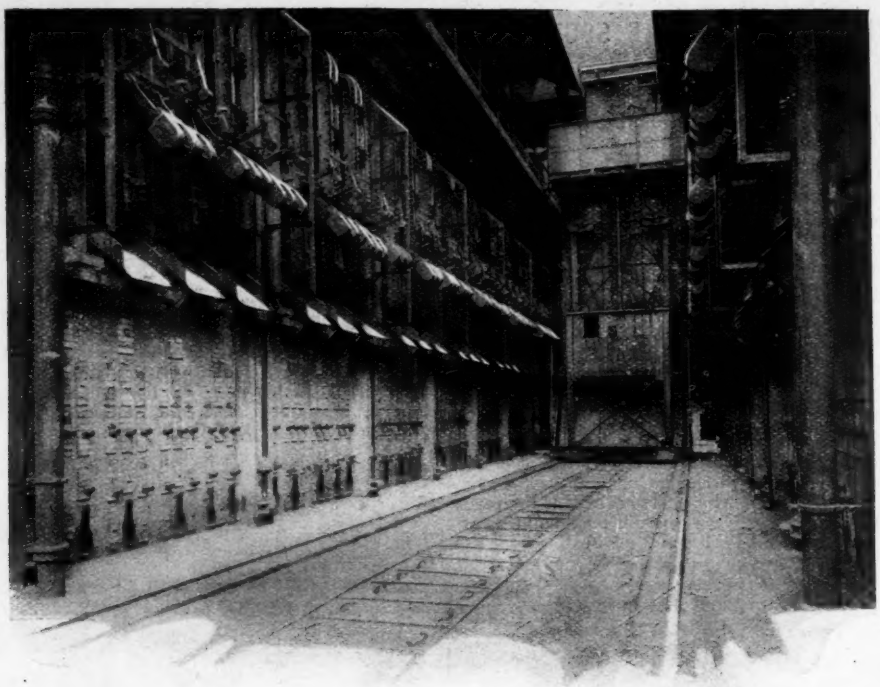
The coal-gas plant consists of twelve benches of inclined chamber-ovens divided into three houses of four benches each. Each bench comprises eight settings of three. The chambers, inclined at 40° to the horizontal, have a length measured along the slope of 6 m., a height of 3·50 m., and a breadth varying from 0·32 to 0·48 m. on the discharging side. Each contains 4700 kg. of coal, which is normally carbonized in 24 hours. Thus one battery deals with approximately 112 metric tons per twenty-four hours, and produces over 34,000 cub.m. of gas; the total capacity of the works amounting to 410,000 cub.m. a day. The ovens are heated by producer gas; each setting having its own producer, and the arrangement of the recuperator and combustion cham-



Coke Plant.

ber being such that combustion commences in front of the setting and is completed near the back, and that even temperatures maintain right across the chambers. The producers have inclined bar grates, and are fed with cold coke.

The charging of the ovens is effected by gravity alone, the coal sliding direct into them through a shoot on a carriage which is traversed under the hoppers. The charging of a chamber is completed in a matter of seconds. Discharging is similarly effected by gravity; the block of coke sliding out into a quenching carriage as soon as the door is opened. The quencher itself is nothing but a hopper surmounted by a chimney for removing the steam and fumes; but the carriage is fitted to perform a triple rôle. It opens the discharging doors, the weight of which is 2000 kg. each; it receives into a hopper the coke, and promptly commences spraying; and finally it distributes the coke to a De Brouwer conveyor on which it is further sprayed. Each quencher, traversing at 15 m. a minute, serves two benches; but a duplicate set of wheels makes it possible to shunt the machine along to another battery. In order to effect such cross traversing, it is necessary to jack-up one set of wheels while the others are adjusted in place. The electric motors—two for raising the doors, two for traversing, and two for the distributor—are installed on the top platform; the controls for these, as well as for the quenching water, being brought into a central cabin. The total weight of the apparatus is 70 tonnes, and its height 14·9 m. It takes five seconds to open a door, and coke is delivered to the De Brouwer conveyor at the rate of 90 tonnes an hour. There are

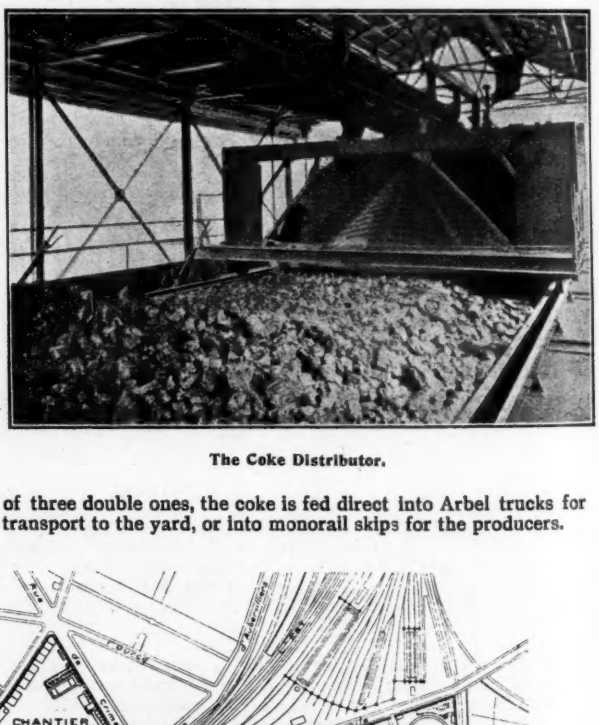


THE QUENCHER BETWEEN TWO BENCHES.

eight of these machines for the twelve benches. If the coke does not slide out of its own accord, a telescopic pusher gives it the necessary impetus. This auxiliary, driven by a 11·5 H.P. motor, can exert a pressure of 1800 kg. on the cake of coke; and it can be traversed along the battery at 18 m. per minute. Whether or not the pusher is called into service, the operation of discharging a chamber only takes a few seconds.

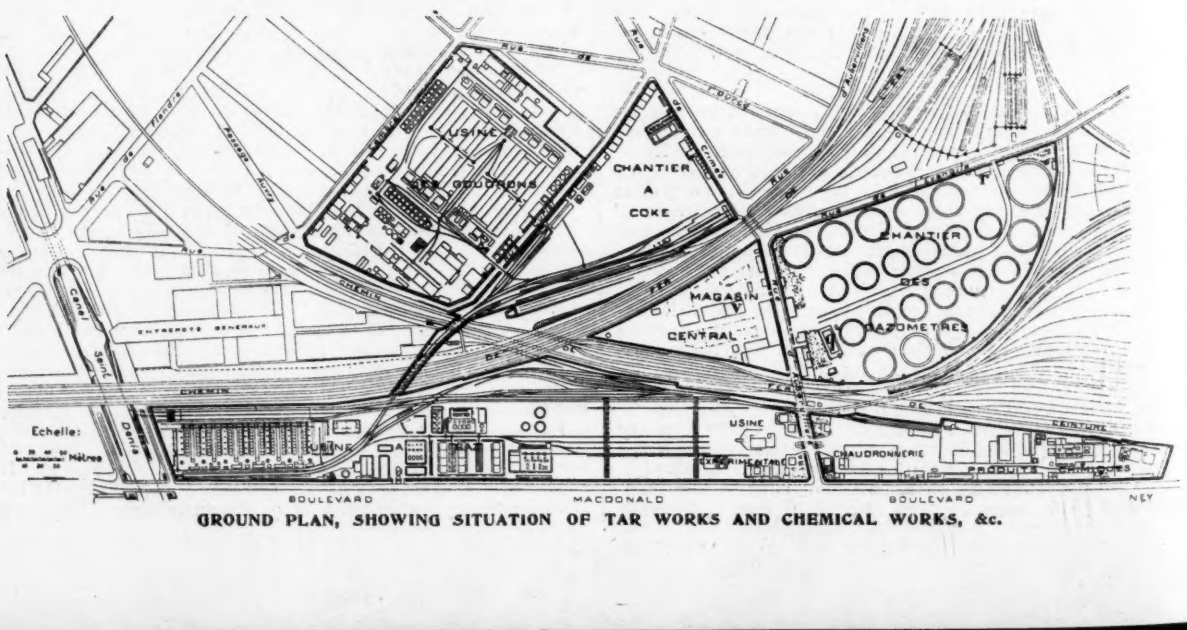
From this brief description it will be realized that the labour necessary for these inclined chamber ovens is much less than for the older types of carbonizing plant. While hand charged 3-metre horizontal retorts only carbonize 150 kg. in 4 hours, and 6 metre machine-charged horizontals 600 kg. in 8 hours, each chamber contains a 24-hour charge of 4700 kg.; and thus, from the point of view of charging, one chamber corresponds to 31 3-meter (hand-charged) horizontal retorts, and to nearly 8 6 metre (machine-charged) horizontals. Further, if one takes into account that the actual charging and discharging demand less effort than horizontals, thanks to the utilization of gravity and the above-mentioned machinery, it will readily be understood that the quantity of gas made per man-day jumps from 600 or 1500 cub.m. per day with horizontals to 4000 cub.m. with chamber-ovens—these figures taking into account the labour on producer-firing, which in each case is practically the same.

The De Brouwer chains which receive the coke from the quenching cars feed, through distributors, the buckets of the Hunt elevators, which raise it to the top of the storage and screening installation. Here the buckets are tipped by a truck which runs along the top of the big hoppers; this truck being constructed to distribute the coke by means of a plough arrangement, at the same time screening out the breeze into an internal trap. [The apparatus is seen in an illustration reproduced from the brochure.] From the hoppers, which are of reinforced concrete and in groups



The Coke Distributor.

of three double ones, the coke is fed direct into Arbel trucks for transport to the yard, or into monorail skips for the producers.



GROUND PLAN, SHOWING SITUATION OF TAR WORKS AND CHEMICAL WORKS, &c.

WATER GAS.

As soon as law permitted (on June 17, 1920) the distribution of such a proportion of water gas as would not bring the quantity of carbon monoxide in the mixed gas above 15 p ct., a C.W.G. plant by Humphreys and Glasgow was put in hand. It comprises four complete sets each of a capacity of 55,000 cub.m. [2 million c.ft.] per 24 hours; each set consisting of producer with mechanical grate, carburettor, superheater, and two washers. A battery of eight annular and six tubular condensers serves the installation; and steam is raised in four boilers from the sensible heat of both blow and run gases. The four blowers, each delivering 8 cub.m. a second at 550 mm. W.G. pressure, are driven either by electric motors or steam turbines. The installation has its own exhauster, meter, Pelouze condenser, and purifier houses; and there are two tar-sealed gasholders each of 2000 cub.m. capacity. All controls are hydraulic and interlocked.

STORAGE AND DISTRIBUTION.

Omitting the section of the brochure which describes the condensing and purifying plant, &c., we read that the gas is stored in no fewer than 21 old-fashioned gasholders, having a total capacity of 298,000 cub.m. [about 10½ million c.ft.] and throwing pressures varying between 120 and 225 mm. It is intended to replace these holders by larger and more modern ones.

Ten 500-mm. pipes feed four town mains—one of 700 mm. and three of 1000 mm.; the pressure being controlled by two governors which are situated under the same roof as two recording calorimeters and a laboratory where continuous testing is carried out. A 700-mm. pipe line connects La Villette with the compressor station at the Landy Works, and the latter are similarly connected to the Clichy Station, so that the storage capacity of the three works may be considered "common property."

POWER STATIONS.

The electric energy for the various sections of the works, which include the bye-products works, the coke yard, and the tar works, is generated in a central station, which comprises a boiler and a power house. Nearby there is an accumulator battery. There are four groups of two Babcock and Wilcox multitubular boilers with mechanical grates and Green economizers. Of the grates, six are Bennis and the other two Babcock. Each of these boilers, with 150 sq.m. heating surface, can produce per hour 500 kg. of saturated steam for the exhausters and for water heating for baths and general purposes, and 2000 kg. of superheated steam at 325° C. for the generator turbines. The boilers are fed by Delaunay-Belleville steam pumps or by Körting injectors; the feed water being purified in a Lamy plant with a throughput of 15 cub.m. an hour.

On the first floor of the power house, there are four generating sets, each consisting of a horizontal Curtiss turbine of 300 KW. at 1800 r.p.m., driven by steam at 300° C. and coupled to a direct-current 250-volt dynamo. A fifth set of 600 KW. capacity is now in course of erection. Four Westinghouse-Leblanc condensers are installed on the ground floor of the power house; and the hot water from this plant passes on to a Balcke cooler. A Tudor battery of 126 cells is connected across the bus bars of the switchboard; and two transformer sets regulate the charging or discharging of these accumulators.

There is a sub-station which supplies the current necessary for the essential services in the event of the central station failing. [The visitors to La Villette on June 28 were shown this.] Here there are a 155 KW. shunt-wound dynamo driven by a 4-cylinder Diesel engine consuming heavy tar oil, and a 100-KW. dynamo driven by a motor taking town current through 12,000/220 transformers.

EXPERIMENTAL STATION.

We pass over the paragraph devoted to ammoniacal liquor, and the very brief reference made to the tar works. The brochure closes with a short chapter on the Experimental Station of the Société du Gaz de Paris, which is near the main entrance to the works. It was originated in 1861 by the old Company for the purpose of studying various coals by distilling them under absolutely definite conditions. In order that the results may be strictly comparable, the methods of working have always been the same; and in consequence much valuable information has been collated. Each test is carried out on 12 tonnes of coal, which is distilled in four horizontal settings of sevens, divided into two groups; and the gas made is treated in a complete independent cycle, and afterwards passes through a station meter to the main storage. In order to exclude all air from the plant, the gas is kept under pressure right up to the meter. Laboratories exist for the sampling and analysis of the gas, and the measurement of its calorific power and density; and elsewhere there are facilities for testing coal for moisture and ash and volatile contents.

Apart from the testing of coal, for which the Experimental Station was specially laid out, there are other laboratories for the study of general questions relating to the gas industry; but in view of the great number of problems which present themselves nowadays, the existing accommodation has become too small, and a project is on foot for the early construction of a large Chemistry Department, where all this work will be centralized.

Alongside the coal-testing plant there is a setting of continuous vertical retorts. In 1920, vertical retorts were considered for the Clichy Station; but before deciding on them it was necessary to establish that such a plant could deal effectively with the coals which normally constitute the Clichy supply. Accordingly this setting of four retorts was installed. Each 8-metre retort has a throughput of 7 tonnes per 24 hours; and the setting is raised 5 m. from the ground to permit the introduction into the building of coke skips. Results during 1922 and 1923 were of great interest, and have shown that an extremely good make of gas is attainable with practically all the coals normally supplied for Clichy; and much information has been collected as to details of the plant.

The same keenness for research has led the Société du Gaz to build at the Landy Works a producer testing station. It was pointed out earlier in the brochure that the labour necessary for firing the settings of chamber-ovens was practically the same as for horizontal retort settings; and according to the tests it has been possible to make at Landy, the substitution of independent producers for those built in to each setting should reduce considerably the labour required, at the same time facilitating and improving the conditions of the latter. Thus the Société have not hesitated to build this station for the investigation of (*a*) large-capacity producers consuming gas-works coke, and their design; and (*b*) producers of poor-quality gas. Satisfactory results were obtained with the Kerpely-Marischka producer, capacity 25 tonnes per 24 hours; and it is this type that will be installed at Clichy. Experiments are now being carried out on the Fichet-Heurtey-Sauvageon ash-fusion producer (40 tonnes capacity), and are proving most interesting; and the Marconnet ash-fusion generator is also to be tried-out.

OIL PRODUCTION IN ITS RELATION TO THE RESOURCES OF THE BRITISH EMPIRE.*

By the late Sir GEORGE BEILBY, D.Sc., LL.D., F.R.S.

For the past sixty years the United States has taken the leading place, not only as producer and consumer, but also as an exploiter, of natural oil and its products; and it may ere long provide the world with an equally important object lesson on the possible replacement of natural oil by the products of the distillation of shale.

As a world's fuel, the only serious rival to oil is coal, the output of which is still ten to twelve times as great. For countries which possess and raise their own supplies of coal, but do not possess natural oil at all, or only in inadequate quantities, the extension of its use is mainly a question of the relative prices of the two fuels at the centres of consumption. The higher availability of the potential heat units in oil and its products determines the higher prices which can be paid as compared with coal.

COAL THE MAIN FUEL.

However, coal is, and must for a long time remain, the world's chief and most important fuel. The corollary to which is that our best efforts must be directed to the more perfect utilization of coal, not merely in its raw state as it is raised at the mines, but as a material of organic origin which lends itself admirably to the re-arrangement of its principal elements, carbon and hydrogen, into fuel, solid, liquid and gaseous, of all degrees of thermal availability, from rich hydrocarbon gases to motor spirit, fuel oil, pitch, and coke.

The working coalfields of the world have all been surveyed, and in many cases re-surveyed, at intervals over relatively long periods. As a rule these re-surveys have not only confirmed the earlier surveys, but have shown that the earliest estimates have been too conservative. The result of these surveys is to show that a definite quantity of coal exists under a given surface area; so that, subject to a reasonable deduction as a margin of safety, this asset is just as real, though of course not so valuable, as if the coal had been brought to the surface and stored. In the case of an oilfield, nothing approaching the same degree of certainty is reached until the field has been completely developed by the sinking of wells, and is already partially depleted. Even at this stage, the uncertainty as to the life of the wells becomes greater rather than less as time goes on.

OIL RESOURCES.

While enormous stores of coal, sufficient to supply the world's needs for hundreds, if not thousands, of years are definitely known to exist, no such certainty as to the future of natural oil can be counted upon even for tens of years. We are left, therefore, with nothing more reassuring as to future supplies of oil than our confidence in the great principle of continuity in Nature, which encourages us to believe that the experiences of the past fifty or sixty years of the opening-up of new oilfields as the old ones are depleted will not be only a brief and unique experience in the history of the world, but that it may go on repeating itself for generations to come, and possibly on an increasing scale.

From three to four years ago, Mr. J. O. Lewis (Chief Petroleum Technologist to the U.S. Bureau of Mines) estimated that at the then rate of consumption the life of the oilfields of the United States would only be twenty years. In other official quarters grave anxiety existed as to the early exhaustion of the oil resources in view of the rapid development in the use of motor spirit for transport by road and air, and of fuel oil for transport

* A few extracts from a paper read before the First World Power Conference at the British Empire Exhibition.

by sea. Mr. Lewis, however, is hopeful that this early exhaustion of home resources in natural oil will be met from other sources. He says:

"Geologists and those well informed on foreign resources believe that in all probability the world contains enormous reserves of oil that can be obtained upon demand. Though to obtain oil from these reserves may not be so satisfactory as to obtain it within the confines of the United States, the outlook tends to assure the future of the internal-combustion engine. Fortunately, the oil may be obtained from other sources than oilfields. In the United States—particularly in Colorado, Wyoming, and Utah—are enormous bodies of oil shales from which oil may be obtained by destructive distillation. The U.S. Geological Survey has estimated the quantity of oil locked up in the richer shales of the three States mentioned as perhaps ten times the amount of the reserve in the oilfields."

BRITISH EMPIRE RESOURCES.

The situation in the United States, as disclosed in the foregoing statements, naturally opens the way to the consideration of the shale and lignite deposits of the British Empire as a future source of oil. Extensive deposits of rich shale have for many years been known to exist in Australia, Canada, New Brunswick, Nova Scotia, Newfoundland, and South Africa. For a number of years capital has been expended in New South Wales on the winning and distillation of the rich shales which are found in the gorges of the Blue Mountains. Though this industry is protected by duties on imported oils, and has further been encouraged by the Government by the offer of bonuses on output, this venture has developed so slowly that it has not reached the stage at which it can be regarded as a practical solution of the problem of home-produced oil in Australia.

In Victoria, the extensive deposits of brown coal in Central Gippsland are now being worked, and this material, which can be very cheaply won, is being used instead of coal for the generation of electricity. It was stated some years ago that it was intended to establish briquetting and carbonizing plant at the mines, on lines similar to those developed in Germany. If success attends this venture, a new and important source of fuel oils may be opened up in Australia. In North America, outside the United States, no important developments of shale distillation have yet taken place, in spite of the fact that the Dominions are practically dependent on outside sources of supply for liquid fuels of all kinds. Enormous deposits of rich shale undoubtedly exist.

The winning and retorting of shale is from its nature an operation which can never be carried out at a cost which will compare with the relatively simple operations of boring and pumping for oil. The cost of the latter operation varies enormously, sometimes exceeding a dollar (say 4s. 6d.) a barrel, but more frequently amounting to only a fraction of this. For our present purpose it may be taken that a barrel of oil at the wells costs 4s. 5d. A group of shale seams yielding on the average one barrel of crude oil per ton of shale would be counted rich, yet even with skilled mining and retorting, this barrel of oil would cost from 6s. 9d. to 9s., or from 50 to 100 p.ct. more than the barrel of natural oil.

While this may be taken as the position in the United States, where natural oil is already established in full possession of the field, the situation in the Empire, where natural oil, if it occurs at all, only does so in very inadequate quantities, is very different; and the development of home sources of supply is sufficiently important to justify the taking of considerable risks in its promotion.

Austrian Gas Association.

In "Das Gas- und Wasserfach" for June 21 appeared a short account of the 43rd Annual General Meeting of this Association, which was held at Salzburg on May 29 and 30, in conjunction with that of the Bavarian Association. Herr Güntner, of Vienna, in his Presidential address, gave an interesting review of the situation of the gas industry in Austria to-day. Hopes expressed at the previous meeting as to the economic rehabilitation of the country had not been fulfilled. Stabilization of the currency, he said, had prevented a repetition of the terrible chaos which had threatened complete ruin in 1922, but normal health was still far from being restored to industry. Great efforts were being made to increase gas consumption, which had fallen off to such an extent in the days of extreme coal shortage. It was a good sign that losses in lighting business were being more than counteracted by sales for other purposes. But the great handicap was lack of capital for development work, almost all of which had to be met out of revenue. In view of this, and of lower prices obtainable for residuals, it was remarkable that gas-works generally had been able to struggle on without any considerable raising of prices. Most disappointing had been the return from coke, due to a diminished home demand, and an increase in imported tonnage, chiefly from France, Belgium, and Czecho-Slovakia, quite unjustifiable either as to price or quality, and in direct opposition to the policy ardently advocated by the Government of restricting imports to a minimum in order to restore the trade balance.

Creosote for Timber Preservation.—According to a study made by the United States Forest Service, creosote is used in the treatment of over 60 p.ct. of all the timber treated annually in the United States. For years prior to the war, nearly two-thirds of the demand was met by imports chiefly from Great Britain and Germany. In 1922, when the total consumption was 86,321,389 gallons, foreign oil contributed 41 p.ct.

INTERNATIONAL COMMISSION ON ILLUMINATION.

Meeting at Geneva.

[FROM OUR SPECIAL CORRESPONDENT.]

After the preliminary proceedings, which were reported in the "JOURNAL" for July 30, p. 446, the Commission settled down to the presentation and discussion of the numerous communications which had been prepared. Great Britain provided a considerable proportion of these, as will be observed from a reference to that report.

A PRIMARY STANDARD OF LIGHT.

The first paper, presented in abstract by Dr. E. C. Crittenden of the United States of America, was by Mr. Herbert E. Ives, on "A Primary Standard of Light following the proposals of Waidner and Burgess." In the introduction, the author dealt with the proposals to use platinum in connection with a standard of light. This metal, because of its high and definite melting-point and its freedom from oxidation or other forms of contamination, has been several times proposed as a means of achieving a primary standard of light, or fixed point in the photometric scale. Among the important proposals are those of Violle and Siemens. Both choose the melting-point of platinum as the definite fixed point, and specify the use of the emission from the metallic surface. In the Violle standard, a pool of molten platinum was used; while Siemens used thin platinum strips heated electrically to the melting-point. Neither of these platinum standards has proved satisfactory on trial, in part because of the difficulty of maintaining the platinum surface clean, in part due to the difficulty of securing chemically pure platinum, and in part due to mechanical difficulties.

Waidner and Burgess in 1908 proposed a new standard which, while embodying the advantages of platinum, offered a means of overcoming the difficulties due to surface contamination of the metal. At the same time their proposal promised to associate the standard of light closely with other standards of physics, specifically those of radiation. Their suggestion was that the standard of light should be *the brightness of a black body at the melting point of platinum.*

The advantages of this may be enumerated as follows:

(1) The temperature at which platinum melts, even though not definitely known (*i.e.*, in degrees Centigrade) is a fixed and reproducible point on the high temperature scale.
(2) The fixed point is unaffected by ordinary variations in the conditions of the surrounding atmosphere.
(3) This radiant emission of the black body is accurately defined by physical constants from which, through the least mechanical equivalent of light, the luminous emission can be derived. Hence, when the black body constants are accurately known, this standard can be directly correlated with other physical standards.
(4) At the temperature at which platinum melts, the colour of light emitted from the black body is closely that of the present incandescent electric lamp standards, so that photometric evaluation of the platinum standard in terms of existing ones is facilitated.

In order to realize the standard proposed by Waidner and Burgess, it is necessary to bare a black body which can be brought to the temperature at which platinum melts, and there must be means for accurately identifying this temperature. The means decided upon was the construction of the black body itself out of platinum, arranged in a form convenient for electrical heating to the melting-point. The form of black body decided on was a hollow cylinder of polished sheet metal. A study of the optical properties of specular reflecting cylinders was made, the results of which indicated that when the interior of a cylinder is viewed through a narrow longitudinal slit at certain definite angles, the interior is substantially black.

According to Kirchoff's law, the bright reflections considered will be replaced by images of low emission when the cylinder is raised to a high temperature, and correspondingly the regions of low reflection will be regions of high emission. As a result of this study it was found that, if a glowing cylinder with a slit of 10° angular opening is turned through an angle of 5°, the emission with platinum (reflecting power about 60 p.ct.) will be black to within less than one-fifth of 1 p.ct.

EXPERIMENTAL WORK.

Considerable preliminary experimental work was necessary to determine the most practical dimensions for the platinum cylinders, and proper methods of mounting. The chief difficulties encountered were in connection with the mechanical strength of the cylinders and the method of clamping them to secure perfect electrical contact. The thickness which was found necessary to prevent warping and crumpling with chemically pure annealed platinum, which is very soft, was 0·15 mm., and the final results were on thicknesses from 0·17 to 0·22 mm. In clamping the cylinders to the short platinum sheathed rods, which form the end supports, the lower end of the cylinder is rigidly held while the upper end is supported on a pivoted yoke which is weighted so as to be in a neutral position. Various precautions were taken to

avoid differential expansion of the several parts of the apparatus, and to shield the platinum from draughts of air.

The platinum used was specially purified by methods which are now available and which yield practically spectroscopically pure metal. Special precautions were taken in melting and rolling it, to avoid contamination. Thermo-electric tests showed that the three lots used for the final determinations gave from 61 to 148 micro-volts against spectroscopically pure platinum. It is estimated, on the basis of other work on the platinum group metals, that these impurities will not cause more than 0·2 or 0·3° C. variation from the true melting-point of platinum, which would correspond in brightness to not more than $\frac{1}{5}$ p.ct.

Measuring the Brightness of the Black Body.

Two methods of measuring the brightness of the platinum black body at its melting-point were employed. Both these depended on forming an image, by means of a lens, of the slit in the cylinder. This image was projected in the first method upon one-half of a specially constructed narrow contrast photometric field. In the second method it fell upon a diffusing glass in front of a specially screened photo-electric cell. In the first, or visual, method of obstruction, the brightness of the projected image of the slit was compared with the brightness of a white surface illuminated by a movable comparison lamp. The experimental procedure was to raise the temperature of the platinum slowly and uniformly, while continuously maintaining a photometric watch by moving the comparison lamp. The position of the comparison lamp was then noted at the instant of melting of the platinum cylinder. The side of the photometric field which had been illuminated by the platinum was then illuminated in succession by several standard carbon lamps. These lamps were moved slowly and uniformly towards the photometric field until, upon touching a contact, a shutter fell, and the reading of the comparison lamp was taken. By this means the personal equation of the observer, due to working observations by approaching from one direction, was minimized. The condition of the photometric balance was rendered definite by the fact that the light from the black body at the temperature of the melt is practically a perfect match in colour with the standard carbon lamps. The special photometric track is given in plan and elevation in fig. 1, from which the arrangement of the various elements of the system may be easily understood.

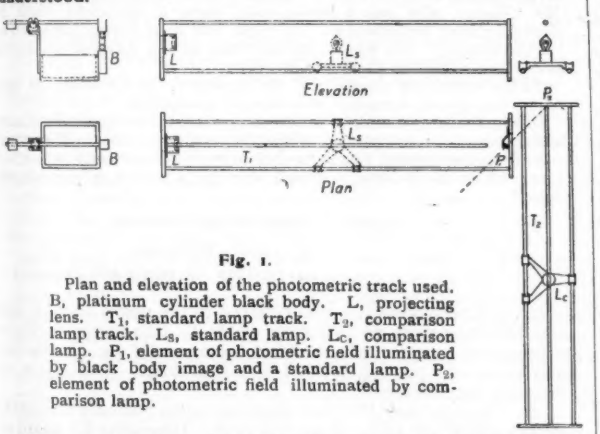


Fig. 1.

Plan and elevation of the photometric track used. B, platinum cylinder black body. L, projecting lens. T_1, standard lamp track. T_2, comparison lamp track. L_S, standard lamp. L_C, comparison lamp. P_1, element of photometric field illuminated by black body image and a standard lamp. P_2, element of photometric field illuminated by comparison lamp.

The second method of observation was characterized by the use of a photo-electric cell and string electrometer for securing the value of the brightness at the instant of melting. The photo-electric cell was made substantially equivalent in its response to the human eye (for the negligible colour difference involved) by the interposition of a colour filter. The string electrometer was arranged to measure the potential drop across a high resistance in series with the photo-electric cell and its batteries. A potentiometer system provided a set of calibration points by which the deflection of the string of the electrometer could be calibrated between each observation. The reading of the string electrometer was recorded on a moving photographic sensitive paper which was afterwards measured. The experimental procedure was to obtain the string deflections due to illumination of the cell by the several standard lamps, and then to obtain a record of the brightness of the platinum black body image as it was brought up to the melting-point. By this means a permanent record was obtained of each melt, which was free from any personal equation of the observer. The photometric precision of this method was found to be 0·1 p.ct.

Forty-six melts were measured by the visual methods described, and the results are shown graphically in fig. 2. Two different lots of platinum were used. Analysis of the results shows a mean value of 55·39 candle-power per sq.cm. The average deviation from the mean is 0·72 p.ct., and the extreme range of the results is 3·8 p.ct. The probable error of the mean, calculated by the standard methods, is 0·1 p.ct.

Comparison of these observations with published observations of the Hefner and the pentane lamps shows the precision of setting to be notably greater for the platinum standard. Its superiority is enhanced by the fact that no corrections need to be established and applied for the varying conditions of atmospheric humidity and pressure.

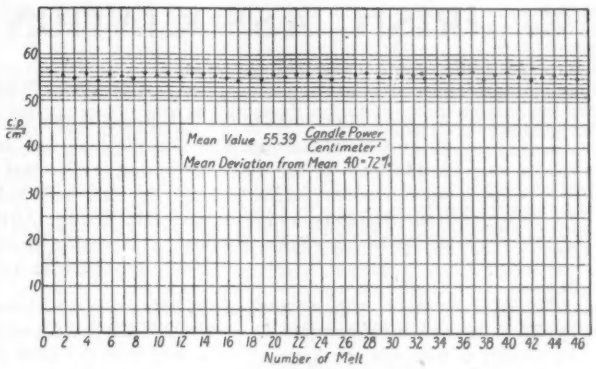

c.p / cm²
60
50
40
30
20
10
Mean Value 55.39 Candle Power / Centimeter²
Mean Deviation from Mean 40=72%
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
Number of Melt

Fig. 2.

Results obtained by the visual method of observation.

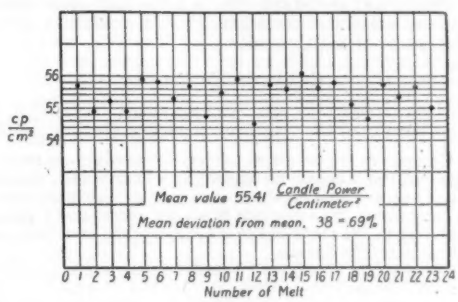

c.p / cm²
56
55
54
Mean value 55.41 Candle Power / Centimeter²
Mean deviation from mean. 38 = .69%
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Number of Melt

Fig. 3.

Results obtained by the photo-electric method of observation.

The final value taken is the mean of the two sets of observations, visual and photo-electric. From a study of the possible sources of error, an accuracy of $\frac{1}{5}$ p.ct. is estimated, leaving the final result for the brightness of the platinum black body at its melting-point 55·40 ±0·11 candle-power per sq. cm.

This value of the brightness of the black body at the melting-point of platinum lies fairly close to the figure which would be expected from such previous measurements as are at all similar. Thus the mean value obtained by Lummer for the Violle standard—namely, 26 Heffner candles per sq. cm.—is interpreted in the light of these measurements as meaning an emissive power of the platinum of about 42 p.ct., which is in fair agreement with direct determinations of this factor for molten platinum. A much more exact check, however, is furnished by the measurements by Hyde, Forsythe, and Cady on the brightness of the black body at various temperatures. A brightness of 55·4 candle-power per sq. cm. corresponds, from the graphs of their results, to a temperature of 2035° abs., which is certainly within 5° of the melting-point of platinum. Another check is furnished by calculations, which are given in full in the original paper, of the brightness of the black body through the temperature range on which the melting-point of platinum lies, using recent values for the radiation constants and a well determined luminous efficiency curve of the spectrum. These computations again lead to the value 2035° as the temperature corresponding to the black body brightness here found.

It is to be emphasized that none of the constants involved in the comparisons just made—the black body constants, the luminous efficiency curve of the spectrum, the high-temperature scale, or the melting-point of the platinum—is sufficiently accurately known, so that these other observations can furnish no more than generally corroborative evidence of the accuracy of the result obtained in this investigation.

The general conclusion is that the various inherent advantages of the black body at the melting-point of platinum as a photometric standard are confirmed by the experimental study. In addition the standard is shown to be practically reliable, and to be superior to existing standards in the definiteness with which its value may be determined by photometrical observation. It is therefore recommended as a primary standard of light.

(To be concluded.)

Heat Without Smoke.—The executive body of the Smoke Abatement Exhibition, which is to be held in Manchester between Nov. 4 and 15, have already received promises of attendance from many highly important bodies—Government, scientific, philosophic, &c. The British Commercial Gas Association, in whose name a quarter of the City Hall has been booked, are organizing a co-operative exhibit for undertakings and manufacturers; and thus, instead of a multiplicity of privately-owned stalls, the gas exhibit will be co-ordinated as at Wembley. The Manchester Corporation Gas Department are taking a large part in the arrangement of the display of gas uses and appliances. By size and diversity the exhibition will be the biggest in its subject to be held in Manchester, and should be of special interest to the representatives of the 15 millions who live within 50 miles of the city.

IRISH ASSOCIATION OF GAS MANAGERS.

ANNUAL MEETING IN DUBLIN.

A LARGE attendance in the Oak Room at the Mansion House, Dublin, last Wednesday, proved the wisdom of the Committee's decision that the time had arrived for the resumption of the Association's activities in the form of an annual gathering. The last meeting of this kind took place in 1919, after which circumstances forced a break in what had hitherto been the regular procedure. The indefatigable Hon. Secretary and Treasurer (Mr. George Airth, of Dundalk) had good reason to feel gratified at the results of his efforts to ensure a successful meeting. Mr. W. E. YOUNG, of Queenstown, the President appointed in 1919, occupied the chair.

Mr. W. G. NORMAN, at the opening of the proceedings, said that the Rt. Hon. the Lord Mayor (Mr. Lawrence O'Neill) had hoped to be present to welcome the Association, as had been the case on previous occasions; but unfortunately he was not in very good health, and so had felt unequal to the exertion.

The PRESIDENT remarked that it gave him much pleasure to see so many present at the meeting. He would ask Mr. Airth to read the report of the Committee.

COMMITTEE'S REPORT.

The HON. SECRETARY and TREASURER (Mr. George Airth, of Dundalk) then read the following report of the Committee.

Your Committee are delighted to meet the members again in session, and hope that the programme before you will receive a thorough discussion. They welcome papers on any subject which will forward our industry, and solicit the assistance of all our members in bringing the Association up to the merit of the old days, when members were only too anxious to fill the breach.

Though as a Gas Managers' Association we know no politics, and recognize no boundary line, we nevertheless feel, like many other purely professional societies, that our activities are somewhat overshadowed by the affairs of the body politic. Owing to the disturbed conditions of the times, it is five years since we had the advantages that arise from an annual exchange of views. Since then a vast change has come over the face of the country; but despite all that has happened, and is happening, we meet again as the Irish Gas Managers' Association, representative of all Ireland. We do not know what the future has in store, but we hope for the best.

So much for external worries. If we may say so, our greatest source of anxiety is largely domestic. We refer to the apathy of the members of the profession at the present time. In spite of repeated efforts to get the Association on a good solid footing, there has not been that response to the call for unity which times and circumstances demand; and all this despite the fact that we have sent out circulars by the score pointing out the advantages of membership. Let us say at once that, no matter how hard the Committee and the Secretary work, their efforts will be vain without the cordial support of those professionally interested. The Association will be what they care to make it. Your Committee would therefore make an earnest plea to those who have not yet joined to do so without further hesitation. Furthermore, they would impress on existing members the desirability of frequent attendance at our meetings. That the Association has weathered the storm is a tribute to those who stood loyally by it in the difficult times from which it has just emerged. We face the future with confidence in the co-operation of our brethren in every part of Ireland.

A scheme for a Commercial Section, which was introduced by Mr. A. S. Brook, of Lisburn, came before your last meeting; and at the time it was favourably received. Everyone agreed upon its utility and advantages. The manner in which it was subsequently treated, however, is particularly illustrative of the way in which communications are dealt with by the members. Though stamped addressed envelopes were sent out along with the appeal to every member asking for his support, not more than half-a-dozen responded. This is not as it should be, and would be otherwise if the members were alive to their vital interests. As many members know, the principle underlying the establishment of the Commercial Section is that of closer co-ordination between the various gas-works. One would not dream of "sending coals to Newcastle;" yet, for want of co-ordination between ourselves, we often do something akin to that. We may retail the by-products of our industry without regard to fellow members whose interests we are overlapping and whose prices, perhaps, we are unthinkingly undercutting. An index system has been devised to overcome this anomaly. It is the bounden duty of members to join this Section, and to supply all the information at their disposal. If we respond with alacrity to calls for information from other sources, we should be at least so well informed about ourselves as to present a united front.

In regard to the status and remuneration of gas managers, your Committee sent out a number of circulars in which they asked any member who had grievances in connection therewith to state them to the Committee. Some members accepted this offer, with considerable advantage to themselves. Your Committee have always been anxious to elevate all salaries to a scale compatible with responsibilities involved and commensurate with the cost of living. The wage-earning community is now so highly organized that it behoves those in managerial posts to see that status and salaries are kept on the proper plane. In this matter, the Committee are always delighted to be of assistance.

At your last meeting, the motion was brought forward to have the subscriptions increased. Owing to the financial position of the Association at the moment, this is absolutely imperative. We cannot carry on with the small subscription of 5s. per annum which we have been receiving; and a motion will be brought forward to increase the subscription of ordinary members to 10s. per annum, and of extraordinary members to 21s. No other Association has as small a subscription as we have. As members of the Committee have to come to Dublin, or some other place in Ireland, to hold the meetings, the least the Association can do is to pay their rail fare. That is all they receive for their services.

Since our last meeting in 1919, death has been busy in our ranks. To all those who have lost loved ones, we extend our deepest sympathies. Notable among those who have departed this year is Mr. James Whimster, J.P., late Engineer and Manager of the Armagh Gas Company. Mr. Whimster was the father and practical founder of our Association. On Aug. 24, 1887, he issued a circular to all gas managers in Ulster calling a preliminary meeting on Sept. 9 of that year at Armagh, to inaugurate a Gas Managers' Association. That meeting eventually took place, and was the origin of the Irish Association of Gas Managers. Until 1903 he held the office of Hon. Secretary and Treasurer, and filled it to the satisfaction of every member and hon. member, and in a way that no other man could have done—the ordinary membership rising from 7 to over 60. In the year named, he was made President. He afterwards again took up the office of Hon. Secretary and Treasurer, until 1908. His labour was given without stint or measure, and all learned with regret that he could not continue any longer to hold the office which he had so faithfully filled for so many years.

Another death we have to record is that of Mr. P. B. Ellacott, of Waterford, who joined the Association in 1910. Mr. Ellacott was an unassuming man who, by his gentle ways and kindly demeanour, endeared himself to everyone whom he met. At our last meeting he read a most interesting paper on the "Steaming of Horizontal Retorts," which received the compliment of a very exhaustive debate. Mr. Ellacott, who was a young man, came to his early death by drowning near Waterford on July 7 last, and he is deeply lamented by the community. He was President-Elect of the Association, having been appointed Vice-President in 1919 20.

To the sorrowing relatives of the deceased, the Secretary, in your name, has already extended your deepest sympathy.

In conclusion, we wish to thank you gentlemen for your attendance, and for your courtesy and consideration on all occasions. If to any of you we have appeared somewhat hectoring in our remarks, we can assure you we have been actuated only by a desire to "spread the light."

Signed on behalf of the Committee,

W. E. YOUNG, President.

G. AIRTH, Hon. Secretary and Treasurer.

Mr. JAMES WOODS (Clones) referred to the death about a year ago, following upon an operation, of Mr. G. Cummings, of Ballymoney, who was one of the oldest members of the Association, and also to the passing away of Mr. T. Duncan, of Glasgow, an extraordinary member.

Mr. AIRTH pointed out that the Committee had only referred to deaths which had taken place this year. Whenever he heard of the death of a member, he sent, on behalf of the Association, a letter of sympathy to the relatives.

Mr. H. KIRKHAM seconded a vote of condolence with the relatives of the gentlemen named, which had been proposed by Mr. Woods; and this was passed by the members rising silently in their places.

THE ACCOUNTS.

The AUDITOR (Mr. G. W. Norman, of Dublin) presented the statement of accounts, and explained that the cash in hand on Aug. 1, 1919, amounted to £35 2s. 9d.; and the sum received for subscriptions up to Aug. 1 of this year was £30 15s. 6d., making a total of £65 18s. 3d. Expenses over the five years had totalled £57 7s. 9d., so that there was a balance in hand at Aug. 1 last of £8 10s. 6d.

Mr. JAMES E. ENRIGHT (Limerick) proposed the adoption of the Committee's report and the statement of accounts.

Mr. P. J. FITZPATRICK (Drogheda) seconded the motion, and it was agreed to.

The PRESIDENT then proceeded to deliver the following

INAUGURAL ADDRESS.

GENTLEMEN,—I thank you for the honour which five years ago you conferred upon me by electing me President of this Association. It is a source of much satisfaction to me, as I am sure it is to you, that internal conditions are so much improved as to permit of our meeting to-day. We look hopefully to a future when peace and contentment will reign within these borders, and when Ireland will take an honoured place in the councils of the nations.

Since we last met, some of the members of the Association (gentlemen who did a great work on its behalf) have been called

to their reward. Our Secretary, on behalf of this Association, has already written to the relatives of the deceased, conveying our sympathy to them; and I am sure we all feel a sense of personal loss in the passing of those we delighted to welcome to our meetings. Their work and example will endure and be ever an inspiration to us all.

I am glad to say that the undertakings which we represent have, in the main, successfully emerged through many difficulties—difficulties at one time thought well-nigh insurmountable. Gas concerns, instead of being things of the past, are more virile than ever. As managers of such undertakings, we realize that the growing popularity of gas as a labour-saving medium in the homes of the people is the principal factor in the success which has attended these concerns, though it is our business and pleasure to bring to the notice of the public all the advantages which the use of gas will gain for them.

It cannot be said that gas companies have received much moral and other aid from the Governments of the day. Where they have received recognition at all, it has only been to impose unnecessary restrictions upon them, though it must be admitted that under the Gas Regulation Act it has been possible to get some relief from the difficulties (not of their own making) which have assailed them—which relief has all been to the good of the consumer.

In the matter of income-tax, gas companies had to be very watchful. In a recent letter of inquiry to the "Gas World" a correspondent draws attention to a case where his directors had bought cheaply a gasholder of 25 p.ct. more capacity than that of an old one displaced, and had promptly been assessed by the income-tax authorities on 25 p.ct. of the cost of this holder. The Editor of that paper shows how unfair this assessment is; and I would that the Inland Revenue officials could be made conversant with the close reasoning of the Editor's reply.

The governmental mind seems always to be obsessed with the idea that electricity is all that matters—that it is the "Open Sesame" to all progress. So we read time and again of where huge electric schemes are to be started under the benign influence of the Government. In the Free State, too, we learn that such projects are being debated. I do not, of course, question the motives of the Ministers of the Government. I believe they are impelled solely by a desire to benefit the country; and undoubtedly a cheap supply of electricity would be a benefit. Expert opinion is, however, very divided on the merits of the Shannon scheme; and it may be that economies in generation would be more than counterbalanced by distribution costs over a sparsely populated district. If so, local generating stations, where the demand is, appear to be the better solution.

In those places where gas-works are in operation, and where a sufficient demand for electricity also exists, I suggest that the Government, by lending money at a low rate of interest, should help the gas companies to supply the need, as they, over all others, have the best chance of making the scheme a success. I do not for one moment suggest that the gas companies should be granted a monopoly, but I do feel that some responsible and expert body should carefully investigate the likely prospects of a competing scheme of lighting. An expensive system of electrification will be no saviour of the country, and a reduced output of gas would force up the price, so that the consumer would have in the end to pay more instead of less.

I think all gas companies, no matter how small, should take steps to obtain statutory powers. The granting of these carries with it, of course, certain obligations, but the advantages are many, making for the consolidation of their concerns.

Since the introduction of the therm method of charging for gas, considerable discussion has arisen regarding the calorific value of the gas to be supplied; and exponents of both high and low heating values have been found. If I may venture an opinion, I would say that in small works such as ours, where we have neither water-gas plant nor other auxiliary plant, and where we rely solely on our horizontals, a moderate standard is best for our purpose. Where there are verticals and steaming, and other apparatus most economically used in the making of a low-grade gas, then, doubtless, a lower standard of heating value should be declared. In some works using horizontal retorts and steaming, a considerably increased make has resulted. I do not wish to speak derogatively, but it would be interesting to know what percentage of the increase was really due to steaming and what percentage to over-drawing on the exhauster. Those of us who have a calorimeter, and who use the Orsat apparatus frequently, will, I think, soon be persuaded that overdrawing does not pay; the small increase in volume being more than lost in the reduced calorific value of the gas.

On the subject of retort-house practice we must not overlook the important question of coke. I think it is near the mark to say that the price got per ton for coke is about equal to that paid for a ton of coal; and this being so, high makes of gas per ton of coal carbonized, if got by an excessive use of coke as fuel, are too dearly obtained. Generally speaking, in practice it will be found that 1 cwt. coke is as good as an extra 1000 c.ft. of gas, and there is less destruction on the retorts meanwhile. There is, of course, a medium in this as in all things; and local factors must be taken into account when striving for the best-paying results.

It is largely to be deplored that better prices for tar are not obtainable; but probably when tar comes into general use for road purposes in this country, a better price will result. As to sulphate of ammonia, the price got for this hardly covers the cost of manufacture; and owing to the distance between our works, it is not practicable to collect the liquor for treatment in bulk.

There is an oft-quoted expression, "Dividends are made in the retort house." The saying was never more true than at the present time; and we must be grateful to those managers of large undertakings—yes, and of small ones too—who, striking out one this way, another that, have achieved wonderful carbonizing results and have been good enough to give the benefit of their experience to us all. In this direction I would draw your attention to an article by Mr. Rambush, of the Power Gas Corporation, Ltd., descriptive of a process of gas manufacture (under low-temperature conditions) at the Scunthorpe Gas-Works ["JOURNAL," Vol. 165, p. 768]. You will remember that the Engineer at Scunthorpe, when the above plant was begun, and who has credit for some of the ideas incorporated in that plant, was at one time an active member of this Association. The working results are so good that the construction and method of working will be carefully studied by all.

In a memorandum issued by the Secretary for Mines and the Department of Scientific and Industrial Research [*ante*, p. 582], an interesting account is given of what has been done by the British Government towards the conservation of fuel. The Fuel Research Board report that the more economical use of coal can only be achieved on a large scale by two main lines of research—first by a survey and classification of the coal seams in the various mining districts by means of chemical and physical tests; and secondly, by investigating the technical problems involved in the attempt to replace some 140 million tons of raw coal at present burned every year in its natural state by other and smokeless fuel obtained from coal by carbonization.

What I have already said goes to prove that on this problem (the economic use of coal) many minds have been directed, and in the past few years great progress has been made. Resulting from the work carried out by the Fuel Research Board, under the direction of the late Sir George Beilby, it is claimed that the process of low-temperature carbonization has been solved in all its essentials. Managers of gas-works will await with great interest fuller details of what has been accomplished by the Board.

In a paper "Recent Developments in the Manufacture of Gas," by Mr. T. Goulden [*ante*, p. 327] at the meeting of the French gas engineers in Paris, and from which I take the liberty of quoting, we are brought up to date with the methods of gas manufacture. As regards the London works, by far the larger portion of the coal is made in horizontal retorts, though verticals are in extensive use in some of their stations. The fact that horizontals are so largely used appears to indicate that, from the standpoint of finance, it has not paid (up to now) to replace them with others of greater efficiency. The managers of to-day have before them a number of approved methods of carbonizing, and happy is he who, needing extensions, can select the one best suited to his needs.

Now that labour is so costly (and I speak more particularly of Irish gas-works, where the labour item is much more serious than it is in Great Britain) we are anxious to learn completely how to reduce our labour costs, and yet not come under the ban of the trade unions if we proceed to put our learning into effect. The day will come when advantage must be taken of all and everything that tends to economy in manufacture, though it is regrettable that some few may lose so that the majority can gain. However, it is given us to hope that improved industrial conditions will soon appear, when, in the greater need in that direction, there will be work for all.

I have already quoted that "dividends are made in the retort house;" but it has also been observed that they can be lost by indifferent management elsewhere. Our mains and services may be tight, our meters good, but in the face of a dwindling population, if we sit inactive, where are we? Some of us cannot cope with the tide of adversity that has befallen our districts; but this should urge us on to renewed effort. It is possible that a temporary display in a consumer's shop window (if we do not have a showroom) would assist the sales by demonstrating to the people all that the gas company can do to serve them. Gas cookers and fires, and gas lighting fixtures and burners have reached a high state of perfection; but managers in Ireland would appreciate a reduction in the price, to bring them more in touch with the capacity of their consumers to buy or their directors to hire out, and we hope it may soon be possible for the makers to reduce prices.

I have been asked on more than one occasion why on these high-class cookers there is not a transparent panel in the door? Doubtless there is a reason; but a little loss in efficiency of the insulation of the oven would not be so retrograde if it enabled the housewife to see how her baking or roasting was progressing. I have often thought it a pity that the radiants of gas fires do not have fibrous asbestos up their centre, but I assume there would be difficulty in getting a perfect flame formation if this was done. There was something pleasing about the old gas fire with the fibrous asbestos front. I would also like to see makers of small-power gas engines fix a self-starting arrangement as a standard fitting to their engines. Where there is electrical opposition we often lose the small power user, not because electricity is cheaper, but because it is so adaptable for frequent stopping and starting.

In conclusion, I would reiterate that we must please our consumers. If competition is keen, let us be more keen still; and, like the village blacksmith, "earn our night's repose." Let us

consider ourselves labourers in all that makes for the good not of ourselves alone, or even of our directors, but for the greater and grander good of all mankind. Let me quote these lines:

How could harvest ere be made,
Manual toil, without thine aid;
How gain riches from the soil,
Without late and early toil,
Or live the life the world still lives
Without the strength that labour gives.
Hail Labour, hail! the task of pen,
The weary arm, the tired nerve,
Each and all his purpose serve
Working for (while time doth spend)
Eternity which knows no end.

THE PRESIDENT'S MEDAL.

Mr. H. W. SAVILLE (Wexford) proposed a hearty vote of thanks to the President for his able address, and said it also devolved on him, as the immediate Past-President, to present to Mr. Young the President's Medal. Mr. Young had had the unique experience of occupying the chair for a period of no less than five years; and he was sure he would wear this medal with great satisfaction and pride.

The PRESIDENT, in acknowledgment, expressed his full appreciation of the honour that had been conferred upon him in electing him President, and now for this additional mark of their esteem. The medal would remain a treasured possession as long as he lived, and he hoped that after he had gone there would be someone left who would still wear it with pride.

NEW OFFICE BEARERS.

Mr. J. P. Whimster (Glasgow) and Mr. L. P. Phillips (Dublin) were appointed Scrutineers of the ballot papers, and subsequently the following new office bearers were declared elected.

President.—Mr. J. D. Smith, of Belfast.
Vice-President.—Mr. J. O. Halliwell, Mullingar.
Members of Committee.—Messrs. J. M'Nicholl, of Cork; T. J. Reid, of Ballina; and P. J. Rooney, of Strabane.
Auditors.—Mr. G. W. Norman, of Dublin.
Hon. Secretary and Treasurer.—Mr. G. Airth, of Dundalk.

POSITION OF THE GAS INDUSTRY IN IRELAND.

Mr. T. J. REID (Ballina) then read a paper on "The Position of the Gas Industry in Ireland—1924." This led to a full discussion.

The paper follows this report, and the remarks of the different speakers will be published next week.

THE NATIONAL GAS COUNCIL.

The PRESIDENT said that during the proceedings considerable reference had been made to the subjects of statutory powers and advertising. It so happened that they were fortunate enough to have with them two gentlemen who were specially qualified to deal with these matters. He referred to Mr. Fottrell, of the National Gas Council, and Mr. Mason, of the British Commercial Gas Association; and he was sure the members would be delighted to have some remarks from them.

Mr. E. J. FOTTRELL (Joint Manager of the National Gas Council of Great Britain and Ireland) thanked the Association for having extended an invitation to him to be present, because it gave him the opportunity of meeting members of the gas industry in his own native city, as well as of witnessing the revival of this important organization—a revival which he trusted might fully realize all the hopes that had been placed in it. It had been remarked during the proceedings that the problem of the present time in Ireland was rather a question of gas policy than of technical matters. From what had transpired during the discussion, it was quite evident that, on the subject of gas policy, the same troubles and difficulties were to be found on both sides of the water. Therefore what had been said in the discussion as to the aims and objects of the National Gas Council of Great Britain and Ireland might be taken as having special application to them. The National Gas Council came into being at a time of considerable difficulty. It was started in 1916, but its real activities hardly commenced until after the war—he believed in 1919. The period which had elapsed since then had perhaps rendered it specially difficult for the Council to get fully in touch with the voice of the gas industry in Ireland. It had not been so simple a matter to fix up meetings, &c., there as had been the case on the other side. The work which had been accomplished by the Council in England, where it had been possible to get the voice of the members expressed, had been so remarkable that it would be a thousand pities if the resources of the Council were not made use of by the Irish members. He thought practically all the members in England would agree that the advantages derivable from the Council varied inversely to the size of the undertaking—that was to say, the smaller the undertaking the greater were the benefits which it received. And as most of the undertakings in Ireland were small, it was therefore particularly to their advantage that they should join the Council. The principal work done had been in connection with the Gas Regulation Act; and a number of undertakings in Ireland were now operating under this Act. He felt he would be correct in saying that the formation of the National Gas Council was welcomed as much by the English Government authorities as it was by the gas industry itself. They had succeeded in England in making the voice of the gas industry heard—to the benefit not only of the industry, but of the consumer as well. If it were possible fully to place the services of the Council at the disposal of the members of the industry in Ireland, as the Council was prepared to do, similar advantage would accrue. The question of electrical competition, with which they were confronted in Ireland, was just the same in England; and in other directions precisely the same difficulties faced gas undertakings. What he asked was that all the members of the Association should join the National Gas Council, and make that Council the instrument for getting the united voice of the gas industry in Ireland heard. The only limit to the activities of the Council was the demand made upon it by its members. Year after year the work had grown; and if they would all join the Council, and make still further demands upon its resources, every effort would be exerted to cope with these demands.

PUBLICITY.

Mr. W. M. MASON (Manager of the British Commercial Gas Association) said he also wished to express his thanks for having been afforded the opportunity of being with them at the meeting. He could not claim to be a native of Dublin, but it had been a very sincere pleasure to listen to the interesting proceedings at this first meeting of the revived Association in Ireland. He had been particularly interested—because the excellent paper which Mr. Reid had submitted had raised points that brought into the limelight some of the main features in the national publicity policy of the British Commercial Gas Association. As Mr. Fottrell had so admirably put it, the National Gas Council stood for the defence of the gas industry of Great Britain and Ireland. It raised

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THE EXCURSION PARTY AT ENNISKERRY, CO. WICKLOW, AUGUST 14.

up a big bulwark which could not be easily surmounted. Another part of the 5s. per million c.ft. subscription went to the Institution of Gas Engineers, and was spent in valuable research essential to the welfare of the whole industry. They would, of course, all agree with this; but some of them might not be quite so happy about the substantial allocation of 3s. 4d. of each 5s. to the British Commercial Gas Association, for spending to the national good. Doubtless they were asking themselves, "How does the publicity work of the Association affect us in Ireland?" Now Mr. Reid, in the course of his paper, had suggested that it would be a good thing to have a publicity campaign in favour of gas as against electricity. This matter had been discussed very fully by the Central Executive in England, on which, as they knew, Ireland was fully represented. To attempt to organize a national publicity campaign on controversial lines would probably do more harm than good, and entail a needless expenditure of money. The only people who would ultimately benefit from such a policy would be the newspapers. The well-reasoned policy of the British Commercial Gas Association had always been pro-gas, not anti-electric—or, indeed, anti-anything. What the Association did was to provide an excellent selection of first-class literature dealing in the best possible way, and from every point of view, with the whole question of electrical competition, including such articles as those recently published by Prof. Cobb in the "Edinburgh Review," by Sir Dugald Clerk, and other well-known authorities. This literature, as well as material of a description more suitable for general distribution, was available for members. Particularly the smaller undertakings had everything to gain by becoming associated with these national bodies, who were able to help them on practically any points of policy or practice on which they might need assistance.

Mr. Mason proceeded to emphasize his meaning by one of his apt illustrations. He referred to the famished crew on a partially wrecked ship, who were dying for want of water, when, had they but known it, all that they needed to do, as they were sailing in the mouth of the River Amazon, was to "dip and drink." So could the members in Ireland and elsewhere dip into the service organization of the national bodies. He then went on to quote some interesting figures showing that the papers used by the Association for publicity purposes had very widespread circulation, not only in England and Scotland, but also in Ireland. He referred to the fact that Mr. Reid had made mention of statements in two papers, both of which happened to be published in London—thus showing that in Ireland these papers were read to a very considerable extent.

In concluding his remarks, Mr. Mason said he was glad that Mr. Reid had struck an optimistic note. Competition was the life of trade, and even the thought of it had undoubtedly stimulated the discussions at this meeting. As a proof of the stimulus to the industry caused by electrical competition, he quoted the remarkable figures of increase shown by the Board of Trade Returns for the last twenty years, indicated in five-year periods. In the five years ended 1907, the increase in gas consumption was 21 p.ct.; in the next five years, it was 23 p.ct. on top of the previous increase; in the next five years it was 27 p.ct.; and in the last five years, ended 1922, there was the remarkable increase of 32·6 p.ct. The gas industry was a big thing, and he was convinced that it was just at the beginning of a new era of success and progress. He urged them all to join the national organizations of whose activities he had been speaking.

Subscription Rate.

Mr. P. J. M'Evoy (Midleton) remarked that the present rate of subscription was extremely small, and the Committee, after going carefully into the matter, had come to the conclusion that if the Association was to be put on a really good basis it was essential that the amount should be increased to 10s. a year for ordinary members, and to 20s. in the case of extraordinary members. He had been wondering whether the members fully appreciated the great work that had been performed by the President and Secretary. There would have been no Irish Association at all to-day were it not for Mr. Airth.

Mr. J. A. Pemberton (Sligo) seconded the proposition, which was unanimously carried.

Other Business.

On the suggestion of the President, it was decided that the place of next meeting should be left to the new President.

A cordial vote of thanks, on the motion of Mr. Airth, seconded by the President, was passed to the Lord Mayor for granting them the use of the room for the meeting, and regret was expressed that the condition of his health had prevented him from personally welcoming them, as he had done on previous occasions.

The Secretary and Mr. Norman were heartily thanked for their work, on the proposition of Mr. Saville, seconded by the President; and acknowledgment was made of the services of the President, on the motion of Mr. M'Evoy, seconded by Mr. A. Kirkham.

This brought to a close the business meeting, in the course of which there had been a short adjournment for light luncheon, on the invitation of the President.

Social Proceedings.

In the evening, the members met again at the Dolphin Hotel, where a party of nearly seventy ladies and gentlemen were the guests at dinner of the Directors of the Queenstown Gas Company, whose kindness in this matter was feelingly acknowledged. A good musical programme was much enjoyed, and speeches appropriate to the occasion added to the pleasure of a thoroughly successful evening. Mr. H. W. Saville proposed "Kindred Associations," which was responded to by Mr. E. J. Fottrell. The toast of "The Ladies" was in the hands of Mr. W. M. Mason, and was acknowledged by Mr. T. J. Reid. In submitting "Prosperity to the Queenstown Gas Company," Mr. J. M'Nicholl took the opportunity of voicing the indebtedness of all present to the Company for their hospitality. The President suitably replied, and the party broke up after singing "Auld Lang Syne."

On the following day an excursion to Enniskerry was taken part in by about fifty members and ladies. The weather at the start left something to be desired, but all shortcomings in this respect were amply atoned for by a glorious afternoon, when a visit was made to the famous Powerscourt Waterfall. The drive afforded an opportunity to those not already acquainted with it of admiring some of the most beautiful scenery in lovely County Wicklow, which was seen quite at its best in the sunshine which followed the early morning rain. Luncheon and tea were taken in the hotel at Enniskerry. Returning to Dublin about eight o'clock, the party separated, with the feeling that the whole meeting had been in every way a success, and that they would certainly be gathered together again next year in even larger numbers to carry on the work of the Association.

THE POSITION OF THE GAS INDUSTRY IN IRELAND—1924.

By T. J. Reid, of Ballina.

[A Paper read before the Irish Association of Gas Managers.]

As our Association has been in suspension for some time, and, indeed, during the past decade of stress and unexampled difficulty has suffered much interruption, it is only natural that in selecting a subject for discussion at this, the first meeting for five years, one's choice should fall upon an attempt to crystallize the happenings of the last decade so far as they have affected our industry, to see where we are, and generally to take stock of things.

That this is the opinion of others besides myself is evidenced by the fact that, notwithstanding the many changes which have taken place in the manufacture and distribution of gas, and the altered conditions under which these are carried on, not one paper treating of such has been forthcoming—pointing, I assume to the conclusion that we have not yet fully recovered from the troubles we have passed through, or have failed to adapt ourselves to the new order of things, or that matters of policy rather than those of a technical nature are at the moment of the greater concern. Whether or not this assumption is correct, I am sure every member present will value the opportunity of voicing his opinions and expressing his views on a matter of first importance to us all.

The Irish Association.

While my chief object is to promote a full, frank, and free discussion upon the position which we occupy in the scheme of things, I have a second object hardly less important, and one which, if carried into effect, might have a considerable influence upon the successful future of the gas industry in Ireland. I refer to the revival of this Association and a return to the old enthusiasm and verve which characterized its early career.

The incidents of the last ten years, fraught as they were with such disastrous results to us, may, and indeed do, form some excuse for the work of this Association having fallen into abeyance; but even in pre-war times a slackening of interest was to be noticed, and our meetings did not fulfil their proper function as an epitome of current happenings in the gas industry, which would have accrued from an honest attempt by each member to give of his knowledge openly and conscientiously. The result was that our meetings fell flat, with no sustained interest which the interchange of ideas would have occasioned; and consequently the meetings themselves were negative in character.

The real good of our gatherings consisted in the informal chats outside the meeting place, where ideas were expressed more in accordance with naked truth, and not in the full dress deemed necessary for the more formal atmosphere of the meetings.

Never at any time was the necessity of an association or organization thoroughly representative of the gas industry in Ireland more required, capable not only of affording opportunity to its members for discussion of those subjects which concern our everyday work, the ventilation of grievances, fears, or obsessions, but also vigorous, powerful, watchful, and competent to protect our interests where and when they may be threatened. It cannot be stated truthfully that our Association has ever been completely representative of the industry, so that it could speak authoritatively on matters concerning the Irish gas industry generally. For some unaccountable reason this Association has never received the active support or adherence of the few large gas-works; and, for reasons more easy of comprehension, it has been denied the support of many of the gas-works whose designation in point of size or importance may be in some doubt. Perchance the levelling influence of the war and subsequent events, and the imminence of a common danger in State-aided electrical ventures of a

comprehensive nature may at this juncture, when our existence as an industry is threatened and our Association is experimentally re-starting its activities, bring about that union of interest and endeavour which would make it actually what it already is in name—the Irish Association of Gas Managers.

If we are to remain in existence as an Association of Managers of small gas-works, then it is clear to me that our usefulness as a protective or protesting force will be negatived, and our efforts must be directed merely towards obtaining within our meetings those fragments of useful information, hints, and experiences which are useful and instructive, but which the formal air of our meetings has failed to produce, and which only seem to blossom in the more genial atmosphere outside. I leave it to the discussion which I trust this matter will receive to elicit some constructive ideas as to how the larger object may be attained, or, failing this, what had best be done to maintain the interest and usefulness of our annual meetings. There certainly is an opportunity now, which may never occur again, of making the Association a thoroughly national and practical institution. Much could be written and said about the happenings of the last decade; and each member could unfold a tale of business carried on in circumstances of the utmost difficulty. Some of these experiences should prove interesting, if only on account of the expedients adopted by virtue of necessity in order to eke out a scanty coal supply, and in various other circumstances. Tragedy and humour would characterize others, as these emotions so often went hand-in-hand or mocked each other; but I cannot give place to such events here, and must go on to a survey of the effects of that period.

The Present Position.

First of all is the casualty list; and it is to be regretted that this has been fairly formidable. About a dozen works have been closed down as a direct result of the wars at home and overseas, industrial strife, and unfair competition. It has been my lot to inspect a number of these works; and a more depressing spectacle, to a gas man, than a derelict gas-works it would be impossible to imagine.

Our sympathies as survivors go out to those who have had to attend and administer the last rites to these unfortunates; but our energies are required for ourselves, for, though we have survived, there are difficulties yet confronting us which will demand all our attention.

In order to appreciate our present position, it may be as well to make a comparison between conditions in 1914 and now. The most adverse condition to be noted, is to my mind, not the price of coal, labour, or anything entering into the production of gas, but the great reduction in lighting hours, which is of course of greater magnitude in provincial towns in Ireland than elsewhere. When one remembers that "summer time" and "uniform time" as applied to Western Ireland operate to the extent of 1¾ hours difference between nominal and actual time for six months of the year, and ¾ hour for the rest of the year, and that in addition to this most serious loss of business has to be added the reduction in shop hours by as much as three hours of lighting time, it can be readily appreciated that this is the most important alteration in conditions affecting our industry. Indeed, so far-reaching in its effect has this reduction in lighting proved, that it may be confidently stated that no lighting business, electric or otherwise, starting operations under existing conditions in provincial Ireland, has the remotest chance of paying a dividend on the capital outlay, unless it obtains an unduly high price for the service.

This might appear to place existing gas concerns in an unassailable position competitively, as they are not dependent altogether upon the supply of light for revenue, and in every case their capital is much less than the cost of any electrical scheme; but such considerations do not always carry the weight they should, and the reasons or want of reason which enter into the inception and carrying-out of some of the electrical schemes in Ireland are well known to you all, and will be dealt with later.

Being deprived of much of our lighting load, the development of the power and heating end of our business has assumed greater importance; but here again we have found our efforts hampered by conditions within the trade, and competition from without. The cost of cookers and other heating appliances has remained too high to enable them to be installed free or at a low rental, as in pre-war days, and the entry of cheap light-weight oil cookers and other heating apparatus into the competitive arena has deprived us of much business that otherwise should have been ours. While there can be no two opinions as to gas heating and cooking apparatus being the more efficient, yet the low price and portability of the oil heating and cooking appliances have caused them to be adopted where they never would have been had similar gas appliances been available at equal prices. Indeed, the question of the cost of cookers and other heating apparatus is one which should receive more attention, as I am convinced that apparatus in every way suitable for the necessities of our business could be sold at much lower prices, and enable us better to meet competition from the cheaper oil appliances, or would allow us to hire such apparatus—which is impossible with high-priced ordinary English types of apparatus.

In this connection I would refer you to an article in yesterday's "Daily Mail," in which the French type of cheap cooker is mentioned in terms of approbation. Any of you who had an opportunity of visiting the Paris Gas Exhibition could not fail to have been struck by the lightness, adaptability, and evident suitability of some of the domestic gas appliances shown there, and which manifestly are in constant and general use. Surely it might be possible to introduce such apparatus here; for, even with some sacrifice of efficiency in their use, we should be able to put into our customers' houses at a low price appliances which would meet every other requirement, and so enable us to sell more gas and satisfy our public at the same time. In this matter there is no use in adopting a counsel of perfection; and it is better to ride in a Ford car than do without a car because we cannot afford a Rolls Royce. What we want is a Henry Ford of the gas-appliance trade who would give us moderately efficient apparatus at a low price.

Even as it is, it would appear that the cost of cookers and such apparatus might be lessened at the point of delivery, if they were forwarded in an unassembled condition. Any one of you can bring forward instances of cookers having made the journey to and from the manufacturers three or more times without arriving intact. This must be a big item in the cost, and might be avoided if supplied in a "knocked down" condition.

The other items of cost of production which have specially increased are coal, freight, and labour; these being at the moment 50, 250, and 300 p.ct. over pre-war costs. Notwithstanding these increases, gas is cheaper as a lighting, heating, or power agent than are its chief competitors in those realms. Considerably increased efficiency in incandescent gas burners has made this form of lighting little less costly than it was in 1914, when prices of gas were about half what they are now; and we can still claim to be able to give far and away the best value for money in this domain. This is especially true of our chief competitor oil, which is four times its 1914 price.

Reviewing prices of gas in England and Scotland, and extra work performed in the heating and cooking sphere, our position has improved, as coal prices are still 2½ times pre-war, whereas gas prices are in no case more than double, and the efficiencies of gas cookers and fires have increased immensely. Given the necessary apparatus at the right price, we might look to increasing gas sales in this direction.

It must not be forgotten that we have just emerged from a long-drawn-out campaign of difficulties, and that we have emerged (battered and war-worn, perhaps) may fill us with confidence that we are destined to survive still further. Not many of our works have been able to avail themselves of improved methods of manufacture as typified by the vertical retort or complete gasification; for, even if conditions otherwise had warranted such expenditure, our scale of operations would not justify the high initial outlay such plant entails. It is to be hoped that it may be possible to produce plant for either method of gasification at a cost which would make it a practical proposition for our small works. I do not see why a vertical retort setting free from any coal or coke handling plant could not be constructed which would permit of the essential and undoubted advantages of this method of carbonization being adopted in small units and at a cost which would warrant its introduction into our small works.

Competition.

Now a few words as to electrical competition. Though we know full well that the claims which have and are being made for electrical schemes of all sorts cannot be substantiated, and though we are fully aware that many of the services of lighting, heating, and power which it is proposed to perform by electricity are, and can be, carried out more economically, efficiently, and with more advantage to the community and the country by existing gas-works, we must also be aware that this knowledge is not shared by the great majority of the people. We know that the word "electricity" has a greater hypnotizing power in Ireland than anywhere else. Everyone appears intuitively to believe that electricity, because it is electricity, is the best and cheapest method of performing any operation. No attempt is made to examine any counter assertions. "Do it by electricity" is the popular slogan; and is it any wonder, therefore, that promoters of all sorts of electrical schemes have found ready acceptance for the alluring prospects they have held out to investors? This is doubly the case if the hyphenated term "hydro-electrical" can by any stretch of imagination be attached to the scheme. It matters not to the promoter if the "hydro" portion of the outfit proves inadequate, and has to be supplemented or superseded by an oil or gas engine. All one has to do to gain a hearing is to suggest a hydro-electric scheme in which any old water, a dynamo, a few poles, and a coil of wire are to provide free light, power, and heat for ever.

It might be thought that one or two instances of such schemes which have not materialized in the Utopia anticipated would make the public cautious. Not a bit of it. We are, as a nation and a people, commonly supposed to be able to express our sense of wrong or injury as well as most. Nothing of the sort. We are the most uncomplaining people on God's earth. We will put up with anything in the way of disappointment, injustice, and hardship so long as we believe we are expressing ourselves according to our inalienable rights. That is why those electrical schemes which have already sprung into existence, and which have no other claim to being other than that they are electrical, and which are uneconomical and unprofitable, can carry on without that protest from those who foot the bill which would have been made elsewhere. It is difficult to get reliable information as to the cost or financial position of these undertakings; but I have information concerning some of them which justifies my stating

that they are not performing, nor ever can perform, the services of the gas concerns which they displaced.

It is little consolation to the gas concern which has to meet competition of this sort to know that its services are better and cheaper; and many of us are only too keenly aware of the influences which operate in favour of electrical schemes, private or public, and which are not concerned with commercial considerations. There can be no doubt that we have not got "a good press," and that the reverse is the case with electricity. Can anything be done to correct this state of things, and give gas the position it is entitled to in the minds and estimation of the public and the Press? We do not take up any antagonistic or aggressive stand in our relationship to our rival. We admit its commanding position in many spheres of activity. All we ask is that as a tried and proved servant we are not dispensed with until it is certain that we can no longer discharge our duties to the public as efficiently or economically as others can. Many trades have now their publicity schemes, and it might be deemed possible that we of the gas business in Ireland should adopt something of this nature. I believe it would pay handsomely if properly carried out.

So far mention has only been made of private or municipal electrical installations; but there is now the possibility of a much larger competitor in a proposed national or State scheme of electricity which is to do for Ireland what coal has done for England and Scotland. Indeed, this scheme has progressed to the stage of a German firm of note having been entrusted with the examination into the practicability of such a scheme. As this firm under certain conditions is to perform the work, it is only reasonable to imagine that their report will not be unduly pessimistic; and no matter what safeguards surround the performance of the contract, we know enough to believe that whether a boon or a failure it will be maintained as an example of how this country can lead the world.

We have two young, inexperienced Governments in Ireland, both of them anxious to do their utmost to prove to creation that they possess the true governing spirit; and in such an electrical atmosphere as Ireland it is only natural that they should give a ready ear to the engineer or promoter, in the expectation of producing a new heaven and a new earth from the waters of the Shannon or Bann, especially when no counter-advice is given. It would appear to be an axiom that the more backward and deficient in other respects the person or community is, the more anxiety is shown to embark on electrical schemes; and while I do not apply this for one moment to our present rulers, yet I do say that, predisposed as they already are, there is a danger of their listening too eagerly to the German charmer. We as an established industry filling a useful place in the community, and contributing in rates and taxes a considerable sum to the revenue of the country and townships, should not allow this, or any other scheme which threatens our interests, to materialize without an examination of its claims, and a protest where these cannot in our opinion be made good.

Now these are my rambling and rather discursive remarks, and of themselves they can have no value unless they stir to speech and then to action—and united action—so that we, while living in friendly rivalry with our competitors and all working together for the good of the community, whose servants we are, may protect our interests and in the ultimate the community's interests against fraudulent or unfair aggression.

(The discussion will be published next week.)

CONFERENCE ON ILLUMINATING ENGINEERING.

A Plea for Promoting Public Appreciation of Good Lighting.

AT the British Empire Exhibition on Tuesday, Aug. 12, there was a largely attended Conference on Illuminating Engineering, when four papers—one of which dealt with the gas lighting at the Exhibition—aroused a discussion of considerable interest. Many times we have suggested that the gas industry should concentrate on the selling of illumination rather than of the various units which act as a means, for however good these units—burners, globes, and other fittings—may be, if they are wrongly applied their value and the prestige of gas as an illuminant are lost. This, among other interesting problems, was stressed at the Conference, from which nothing but good can result.

THE EFFECT OF LIGHT ON HEALTH.

The chair was taken by Mr. J. W. Beauchamp, M.I.E.E., of the Electrical Development Association; and the first paper to be read was one by Mr. L. Gaster, Hon. Secretary of the Illuminating Engineering Society, who indicated the best means of promoting public appreciation of the benefits of good lighting. He referred particularly to the Proceedings at the First International Conference on Industrial Hygiene, and the meeting of the International Illumination Commission held in Geneva last month, referred to in the "JOURNAL" for July 30, p. 446, and in this issue, p. 642. The Conference on Industrial Hygiene cordially approved the view that good lighting, in common with proper ventilation, heating, and sanitation, should be regarded as essential to the health of workers. Mr. Gaster mentioned that at that Conference he had emphasized the need for consultation between physiologists and experts on hygiene and those familiar with the technicalities of illumination, and that a resolution affirming the desirability of such co-operation had been passed. It had been decided, he said, that the International Illumination Commission should keep in touch with the Hygiene Section of the League of Nations, in order that specific problems in regard to industrial lighting might be brought before the notice of the Governments of the respective countries. At the meeting of the International Illumination Commission there had been general recognition that regulations for industrial lighting should be based primarily on obtaining conditions essential to the health and safety of workers, and that at present standard minima for working illumination should not be enforced by law.

THE NECESSITY FOR JOINT EFFORT.

After referring to a paper by Dr. J. W. Lieb, in which the author estimated that at present lighting forms barely 1 p.ct. of the cost of living of the average family, and summarized some of the advantages to be obtained by better lighting, Mr. Gaster said that the conclusion to be drawn from all the papers delivered at the Geneva Conference was the necessity for joint effort on the part of all sections of the lighting industry in this country, as in the United States, and the desirability of enlisting the help of independent bodies in order to ensure rapid progress of the movement for the promotion of better lighting. Among the steps which suggested themselves for this purpose were: (1) The arrangement of frequent public lectures and papers, before industrial and other organizations, emphasizing the results to be obtained by better lighting; (2) the initiation of lectures in colleges and simple addresses in the schools, the organization of essay competitions on illumination, &c.; (3) the publication of articles on lighting in the daily and technical Press; (4) the organization of demonstrations of lighting, which should be conducted not only by manufacturers but by gas and electricity supply undertakings throughout the country; (5) the fuller recognition on the part of supply companies that their functions include "service" as well as the supply of gas and electricity, and the organization of illuminating engineering departments by the various gas and electricity supply undertakings; (6) the furnishing of adequate support to the Illuminating Engineering Society, to enable them to correlate these various activities.

WASTE OF ELECTRICAL ENERGY.

Mr. W. R. Rawlings, who was the first to rise in the subsequent discussion, maintained that there was still a want of co-operation between suppliers, manufacturers, and users, which militated against effective propaganda work. There was no question that if the public were once trained to appreciate the advantages of good lighting, they would be satisfied with nothing less. The speaker suggested that there was a tendency in modern electrical practice to employ light sources of high intensity, and then by means of devices such as semi-opaque screens to shut out part of the light, so as to avoid glare. The result of this was a wastage of energy.

With this view we are entirely in agreement. Waste implies unnecessary expenditure; and with electricity at its present high cost, such dissipation of energy should be unpardonable. But there is reason underlying this apparent nonchalance; and it is to be found in the high intrinsic brilliancy of the electric lamp, from the effects of which the public have to be shielded, unknown to themselves, by excessive payment. Mr. Murray Griffith stated that there was a leaning towards over-illumination, and that in many cases electric lamps were too "strong," as he termed it.

MOCK DAYLIGHT.

Mr. C. Raphael drew attention to the fact that showrooms in general concentrated on the exhibition of various types of apparatus rather than on the demonstration of good lighting effects. There is much in this statement, which points to the fact that gas and electricity undertakings have not yet fully appreciated the change which has taken place in the public mind. The public want results; and for the attainment of these they leave the details to the supply undertakings, who should realize that it is the "indirect appeal" which at the present time holds attraction for the majority. After suggesting that effort should be made to educate the architect and the contractor in methods of obtaining satisfactory illumination, Mr. Raphael had a few words to say on the subject of diffused lighting. When this method was employed, he said, the effect was often depressing because of its wearying monotony; it was simply like a very dull day. Good lighting should provide a certain amount of contrast. Of course, if this were carried too far, it would result in glare in a less acute form. Perhaps the Illuminating Engineering Society would investigate the problem, and determine a suitable ratio between general and spot illumination. He was also of opinion that, in regard to industrial lighting, clauses should be inserted in the next Factory Act.

THE FACTORIES BILL.

Miss R. E. Squires, of the Factories Department of the Home

Office, was able to give some information on this point. With regard to industrial lighting, the Factories Bill at present before Parliament contained a lighting clause which gave the Secretary of State power to make Orders respecting the adequate lighting of factories. Inquiry into this question had been proceeding for many years, and the present action was the culmination of the work done by the Departmental Committee appointed by the Home Secretary to inquire into industrial illumination, which Committee had issued a valuable and comprehensive report in 1915, and supplementary reports in 1921 and 1922. The speaker agreed with Mr. Gaster that in certain industrial processes it was inadvisable to lay down minima. It was preferable to recommend what was considered to be good practice. Undoubtedly there was a great need for more propaganda. Even in factories employing similar processes, the amount of illumination varied to a wide extent. Employers and workers should be educated; and it was well to bear in mind that those who occupied positions such as that of foreman or works manager had considerable influence in the matter of factory lighting.

Mr. W. T. Dunn, Secretary of the Institution of Gas Engineers, emphasized the value of the work which had been done by the Illuminating Engineering Society, the progress of which had been watched carefully and sympathetically by the Institution of Gas Engineers. The Society were not prejudiced in favour of any particular illuminant, and this fact appealed strongly to those who desired to render service to the community. Mr. Dunn remarked that on several occasions he had encountered people who were under the impression that the lighting in the Amusements Park at Wembley was due to electricity. Perhaps it would be a good thing, he said, if the word "gas" was printed on the globes; for the lighting certainly constituted an excellent example of the capabilities of gas.

Resolutions.

The Chairman then proposed that the following resolutions should be adopted by the meeting.

1. That as a result of eighteen years' experience of illuminating engineering in this country and in the United States, this Conference considers that the time is ripe for a comprehensive effort to promote public appreciation of the benefits of good lighting, and views with approval the desire of the Illuminating Engineering Society to prepare a suitable scheme for this purpose, with the co-operation of other bodies interested in various aspects of illumination.
2. This Conference recommends that every support should be given by institutions for the encouragement of research, by members of the public, and by all sections of the lighting industry to the Illuminating Engineering Society in carrying out such a scheme.

This was seconded by Mr. W. J. Liberty, and was passed unanimously.

Illumination of Highways.

The next paper to be submitted was one by Mr. E. H. Fryer (Head of the Road Department, Automobile Association) on the illumination of highways from the motorist's point of view. At this stage Mr. W. J. Liberty took the chair. With regard to street lighting, the author said that a national standard is most desirable, for the reason that night traffic on the roads is bound to increase; and he epitomizes the reasonable requirements as follows:

(*a*) Even illumination of the road surface, of the footways, and of road junctions and crossings.
(*b*) No glare or dazzle from naked lights.
(*c*) No shadows. Nothing is more disconcerting than suddenly to discover a still dark object on the road just in front; and, as things are at present, the only real protection the motorist can have is a sufficiently powerful headlight to overcome shadows cast by the moon and other minor lights.
(*d*) A uniform height of suspension of the light, together with a uniform distance between light sources.
(*e*) Illumination of danger, direction, and village signs and of street nameplates.
(*f*) Some system of controlling the lights to give additional illumination when that provided by theatres, kinemas, hotels, shops, railways, &c., is curtailed.
(*g*) Auxiliary lights on the lamp standards themselves, to obviate accidental impact.

Possibly the ideal system of street lighting, stated the author, would be from lamps fitted with parabolic reflectors projecting a strong beam in the direction of proceeding traffic, but fixed at such a height and angle as to avoid dazzling drivers on the other side of the highway who are proceeding in the opposite direction.

We must pass over many points of interest in both the paper and the discussion which followed. It was generally agreed that good street lighting should be more diffused than it is at present, that the light sources should be at a greater height, and that a higher standard of illumination is desirable. What better medium than gas is there to comply with the desideratum of diffusion? Naturally the question of cost arose; and here again gas stands out as the most economical form of illuminant.

Electric Lighting at the Empire Exhibition.

During the reading of the next two papers, Mr. Gaster occupied the chair. The first paper, by Mr. Haydn T. Harrison, M.I.E.E., dealt with the electric lighting at the British Empire Exhibition. Owing to the illness of the author the paper was delivered by Mr. C. H. Cunliffe. It is mentioned that the scheme as it exists differs from the one originally proposed. Briefly it entails the flood lighting of the buildings and the general illumination of the Exhibition grounds. The flood lighting is effected by low-voltage gasfilled tungsten lamps with concentrated filaments and deep short-focus parabolic reflectors directing 76 p.ct. of the total luminous flux within an angle of less than 5°. Several thousands of these projectors, illuminating facias at 300 to 1000 ft. distance, are in use. The main feature of the lighting of the grounds is the employment of sources of high power but low intrinsic brilliancy, with a view to eliminating glare. The spherical globes were, for artistic reasons, erected at a low altitude; but as the luminous area exceeds 900 sq. in., the brilliancy is low, despite the fact that these lanterns furnish 600 to 1000 c.p. Flashed opal glass was used to obtain uniform brightness. The interior lighting includes the illumination of some of the largest buildings in the world. The light sources containing gasfilled lamps are suspended as high as possible. Lamps are in general equipped with concentrating reflectors of the vitreous enamelled steel type; and the resultant floor-illumination of 3 foot-candles is obtained with an expenditure of less than 0·3 watts per sq. ft. of floor surface. The illumination of exhibits and stalls was left to the personal requirements and taste of exhibitors, provided that certain regulations devised to ensure the comfort of the public were complied with.

At What Cost?

A question which immediately occurred to us when listening to this paper was: At what cost is the low intrinsic brilliancy of the electric light sources obtained? It would be interesting to know what proportion of the light is transmitted through the semi-opaque globes surrounding the lights.

GAS LIGHTING AT THE EXHIBITION.

The final paper was read by Mr. G. L. Jennings, Distribution Superintendent of the Brentford Gas Company. This was concerned with the gas lighting at the Exhibition, and will be read with interest.

The question of the lighting of areas to be used for amusement purposes is one which particularly appeals to the showman and the illuminating engineer. It must be brilliant in character; but, in my opinion, there is no need for a system of any particular intensity—it is the bulk and the amount of light rather than the particular power of the units to be employed which should be aimed at. For instance, dealing with the installation we are discussing to-day—the lighting of the Amusements Park at the British Empire Exhibition—while, I think, everybody agrees that it is particularly well lighted, yet I find that extremely few people have noticed the source of the light.

When the question of this lighting first arose, I pointed out to the authorities the advantages of using gas for this purpose, and drew their attention to the fact that practically the whole of the amusement area of the White City had been lighted by means of gas. If I may just refer to the White City installation for a short time, it will probably be within the recollection of many that the lighting was done by means of high-pressure gas—that is to say, the pressure was raised to about 2 lbs. per sq. in. I feel convinced, however, that there is no need to employ high pressures for really effective gas lighting; and it follows that the cost of laying the special mains can then be avoided.

Standard of Illumination.

At the British Empire Exhibition it was desirable to fix what standard of lighting should be given; and I took as the standard the lighting outside the residence of H.M. Queen Alexandra, at Marlborough House, and the special lighting illuminating the drive. This standard was, as a matter of fact, slightly exceeded. It is extremely useful, in describing lighting, to be able to take a particular instance, and to say "the lighting that I am proposing to give you shall be of this standard." It enables people to visualize much better what will be given, than to lay down 2 or 3 candles per sq. ft., which, to anyone who is not an illuminating engineer, carries very little meaning.

Details of the Installation.

It was resolved to use low-pressure lamps fixed at a height of 14 ft. 6 in. from the ground to the reflector, and to have two lamps on each standard. I will refer to the fixing of these lamps. The object we had in view was to make the installation as practicable as possible—not to supply an ornate or unusual pattern of column, but to make the installation such that any lighting engineer who viewed it could say, "That is an installation of lighting which I could instal in my own particular locality at a reasonable price." For this reason a plain column was chosen, which was obtained direct from the Claycross Iron Company, Ltd. It is easy to cast, and requires no elaborate patterns. With regard to the extensions and arms, these were made of wrought iron in the shops of the Brentford Gas Company, and to a great extent were made up of standard fittings. The arms are welded, and in practice have proved very suitable for their work. To obtain greater rigidity of the wrought-iron arms, and to cover the connection between the cast-iron pillar and the wrought-iron arm, a box was cast in two sections. These were bolted together when fixed, and greater rigidity was obtained in this way. This point was one which we felt ought to receive special consideration, having regard to the height at which the lamps were fixed, to the elevation of the ground generally at Wembley, and the wind stresses to which the lamps were likely to be subjected. We decided that the lamps should be

60 ft. apart, and the distance across the road between the columns 30 ft. The lamps chosen were of a new pattern, designed and made by Messrs. Stanlforth, of Cricklewood. They are of strong construction, and in practice have been completely satisfactory. They consist of a strong copper exterior, and a cast superheater carrying 16 mantles in each lamp. The air and gas controls are of a substantial nature. All the fittings of the lamps, cups and balls, &c., are heavy, and the weight of the lamp complete is 42½ lbs. You will therefore appreciate that everything to do with their fixing had to be solid. The effect of wind on these lamps is very small indeed. Prior to approval, they were tried under a wind pressure of over 1 lb. per sq. in.; and from all tests they emerged satisfactorily.

Maintenance Costs.

The maintenance figures for glass and mantles are good, especially having regard to the fact that these lamps, being for exhibition use, receive special attention. In dry weather, I may perhaps be permitted to say that Wembley is somewhat dusty, and the glass accordingly has to be cleaned with great frequency. This means that the mantles are considerably exposed, for when the glass is being cleaned every day they are much more likely to be broken than where glass is cleaned every one or two weeks. The consumption of gas in the lamps is also satisfactory. You will remember that the period over which we have had experience has been of the shortest hours of lighting and those of the longest hours of by-pass lighting; but, including the by-pass, the consumption has worked out at under 34 c.ft. per hour for the lighted hour. This gives us a consumption of slightly over 2 c.ft. per mantle.

A certain number of the lamps in the Exhibition are metered, and the hours of lighting carefully observed; and from this the average consumption of the lamps is ascertained. They are very uniform in this amount. There is a continual decrease in the number of globes being used, and we are now at a figure of 2 or 3 per week. While on the subject of glass, I should like to say that I find there is a quick weeding-out of any glass that is likely to break—that is to say, starting with an installation of over 300 lamps, I have observed both here and at the White City, that during the first week or two the breakage of glass was somewhat high. It seems to be a case of weeding-out glass which has received faulty annealing, or which has some other undiscoverable but inherent fault. Once this weeding-out is finished, the glass breakage is reduced to a low figure. I have still in use glass which was put up when the lamps were first lighted at the White City in 1908, and which is as good to-day as then. This speaks well for the resistance to breakage of glass that has become thoroughly acclimatized to its work.

With regard to the illumination, we had a trial run of the lighting, for the first time, two days before the Exhibition opened. There was no need for anything earlier; and for the first few days of the opening of the Exhibition there was no illuminant other than gas in the whole of the Amusements Park, so that the result of the lighting could be seen unaffected by any other source. I found that at 10 o'clock at night, with no moon, I could read my newspaper comfortably throughout the whole area lighted by gas, and that there was practically no place in the road where it was not possible to read the ordinary print of a book. I am not going to work out for you the exact lighting of this road, but I was interested in a conversation I had with the Official of the Amusements Park, with whom this lighting was arranged. He said "there is one thing in our section that has never given me a minute's anxiety, and that is the gas lighting." As I have already stated, each lamp has 16 mantles, and the nominal candle-power is 1600. On test they are found to be very close to this figure, an observed candle-power of 1500 being obtained.

I have hitherto been speaking of the Amusements Park only; but it is probably known to most of you that the Exhibition Authorities determined to adopt this system of lighting in those roads in the Exhibition area which are adjoining the Amusements Park, and they have put up lamps there to the number of 100. These are identical in all respects with those in the Amusements Park.

The Effect of Gas Lighting.

I should like to review briefly the effect of this lighting. I am probably giving away no secret when I tell you that it is customary at these Exhibitions to find out where the people are; and it is found that after the lighting-up period has arrived, over 96 p.ct. of the total people in the Exhibition are in the Amusements Park—an excellent tribute to the efficiency of good lighting for attraction purposes. There are situated at various places in the grounds, where it is desirable that an extra pull should be given or where the light can be seen from a distance, a number of columns carrying 4 lamps—a total of 64 mantles with an observed candle-power of over 6300. The columns for these were made taller; the actual casting is 14 ft. 6 in., and the lamps have been fixed at a height of 17 ft. to the reflectors.

There is one other feature of the lighting to which I attach considerable importance. As you are aware, the hoardings and sides of the buildings must be lighted; and as these are of a greater height than the source of light, it was necessary to see that the whole of the light was not thrown in a downward direction. To achieve this, the burners and mantles were brought lower in the lamps than is usual. They were brought-down 1¼ in., so that the angle of the light from these burners would allow of the effective lighting of all the painting and descriptive matter either on the walls of the buildings or on the hoardings. The authorities of the Amusements Park laid considerable stress upon this, as great importance was attached to the decorations that had been put on all the available walls.

There has been one small drawback, happily not very difficult to get over, resulting from the lighting generally, and that is the desirability of getting articles on sale near to the gas lamps. I think there is scarcely a lamp in the area which has not its attendant automatic cigarette seller, sweet-machine, or fortune-telling apparatus close to it. This makes access to the lamp slightly more difficult than it need be, but it has not caused a great amount of trouble.

The lamps are lighted at dusk, no fixed time being made. The weather is judged, and the lighting time accordingly fixed by the degree of darkness. The lamps are extinguished shortly after 11 o'clock, a few being allowed to remain in lighting when work is in progress during the night.

Criticism of the Electric Lighting.

The Chairman, in opening the discussion on the lighting at Wembley, made it perfectly clear that the Illuminating Engineering Society were not responsible for the results of the electric lighting. This "spontaneity" seemed to indicate that the Society were of the opinion that the results could not be deemed highly satisfactory. Mr. Raphael remarked that a much greater intensity of light was needed, and that the whole scheme should have been planned on a larger scale. The flood lighting, he said, produced a cold effect, and this was not offset by the dimness of the illuminated spheres. The whole effect was too scientific and too flat. Mr. J. S. Dow also suggested that there was an insufficiency of illumination. We agree with this, but are aware that the cost of electricity is not favourable to an over-generous supply. No mention was made in the discussion of the frequent failure of the electric current—but let this pass.

Congratulations to Mr. Jennings.

Mr. F. C. Tilley, ex-Chairman of Council, Society of British Gas Industries, said that Mr. Jennings was to be congratulated on an installation of gas lighting which well represented the gas industry. In both the gas and electric lighting at Wembley the public had something interesting and beautiful.

CARBONIZATION OF SEAWEED.

From H.M. Stationery Office, Imperial House, Kingsway, W.C. 2, we have received a copy of the Fuel Research Board's Technical Paper No. 9 dealing with the "Carbonization of Seaweed as a Preliminary to the Extraction of Iodine and Potassium Salts." (Price 6d. net.)

Seaweed has been utilized in the British Isles chiefly for two purposes, the fertilization of the soil and the extraction of potassium salts and iodine. It has been collected, for one or other of these purposes, on many parts of our coasts. To-day its more important use is as a manure; but in the nineteenth century the harvesting of weed for the recovery of chemical products afforded not a little employment, particularly in the West of Scotland and in Ireland. For the recovery of chemical products certain varieties only are sufficiently rich in iodine to warrant collection and treatment.

The report deals with the possibilities of a carbonization process for the recovery of iodine and alkali salts. The old process, known as kelp-burning, was carried out almost entirely by people of the poorer classes residing in districts remote from industrial centres and where the only other possible employment was fishing or farm labouring. The methods employed were very crude, and undoubtedly resulted in the loss of a high percentage of the available products. That these methods are capable of considerable improvement is shown by the work of Stanford in 1870-90; and this investigation is a further endeavour to provide data which might be useful in the devising of a self-contained system of carbonization whereby the kelp-weeds could be dealt with in such a way that there would be no loss of iodine, and that the gaseous products could be utilized for the firing of the necessary retorts. If such a system were devised, it would be operated as close as possible to the collecting stations, and transport facilities would be necessary only for the relatively small proportion of carbonaceous matter or ash containing the potassium salts and iodine. The tar formed would presumably find a market, or alternatively could be used as an additional source of fuel. Such a system might, if properly used, bring back to life an industry which would be extremely valuable for economic reasons in providing employment in outlying districts where the labouring classes are, at present, very poorly provided for.

The possibility of a carbonizing system being made self-contained thermally is discussed, and the importance of thorough air-drying of the weed emphasized. The therms of gas available for retort heating amount to 15·1 per ton of dry weed; and it is shown that this could be augmented by the 46·3 therms available in the extracted charcoal. The 23·5 therms available in the tar could also be used if necessary, but it is probable that the tar would be more valuable if sold as such. The results as a whole confirm the pioneering work done by Stanford in 1870-90, and indicate that the subject might possibly repay work on a larger scale, whereby the thermal aspect of the question could be thoroughly investigated.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

On Thermal and Chemical Balance-Sheets.

SIR,—Dr. Travers, in his article published in last week's issue of the "JOURNAL" p. 583, criticizes the Gas Investigation Committee for having chosen too high a value for the sensible heat of tarry vapours. He bases his criticism on the assumption that the "molar specific heats" of hydrocarbons "increase only slowly with increase in molar weights." If this be the case, it is difficult to understand why Regnault should have obtained the high value of 0·50 K.C.U. per kg. for the specific heat of turpentine vapour ($C_{10}H_{16}$) at 170° C., as this leads to a molar heat value of 68 K.C.U. per kg., or 68 C.H.U. per lb., against Dr. Travers' accepted value for $C_{10}H_{16}$ (?) 22. Assuming Regnault's value is correct and may be applied to tarry vapours of the same molecular complexity, we have :

Specific heat of 136 lbs. of $C_{10}H_{16}$=68 C.H.U.
The carbon content of 136 lbs of $C_{10}H_{16}$ is 120 lbs.
Per lb. of carbon the specific heat of $C_{10}H_{16}$ vapour
$=\frac{68}{120}$=0·57 C.H.U., or 1·03 B.Th.U.

I do not wish to imply that these values represent the specific heats of tarry hydrocarbon vapours, but that there are hydrocarbon vapours whose heat capacities are largely in excess of the value taken by Dr. Travers, and even in excess of the value chosen by the Gas Investigation Committee.

The text of Dr. Travers' paper would appear to require correction in one or two places—for instance :

In example (a) illustrative of Table 1, p. 584, 30 lbs. of $CO_2=\frac{30}{44}$= 0·68 L.M. of CO_2 (*not* 2·5)

Sensible heat of 30 lbs. of CO_2 = 0·68 × 8890 = 6045 C.H.U. (*not* 22,225).

In the thermal balance on p. 585, the total credits and debits do not balance ; the credited sensible heat of air from 0° to 20° C. should have been 5560 C.H.U.

"CAREFUL READER."

Aug. 18, 1924.

Carbonizing of Coal in Bulk (Becker Ovens).

SIR,—Mr. D. Rider, in his reply letter in your issue of Aug. 13, about the performances of the Becker ovens, admits something which he terms "an obvious misprint." I will venture to suggest that there is one still more obvious misprint—namely, the coke-yield figure, 0·7575 ton per ton of dried raw coal.

With the information now to hand, it is possible to check the original statement issued by the Woodall-Duckham Company, and work out a weight balance. It is clear that a coke residue from a raw coal which has yielded 12,700 c.ft. of gas cannot possibly contain more than (say) 3 p.ct. of volatile matter, rather less.

We now have :

Original moisture in raw coal, 5 p.ct.	0·0500	ton per ton of coal.
" volatile matter " 33 p.ct.	0·3360	" " "
Total matter recovered by distillation	0·3860	" " "

Accounted for :

Gas	0·1620	ton
Tar	0·0620	"
Light oil	0·0135	"
N_2 in sulphate	0·0027	"
Volatile matter in coke	0·0227	"
Total	0·2629	"

0·3860 − 0·2629 = 0·1231 ton of liquor, including losses.

By substituting for the "obvious misprint" of 28·2 gallons the nitrogen in the sulphate recovered, you will find that the total weight of all the products recovered from the Becker ovens amounts to 99·77 p.ct. without the liquor, and with it to 112·08 p.ct. Consequently, there must be another "misprint"—viz., the coke percentage. Should not this read 0·7575 − 0·1231 = 0·6344 ton, or 63·44 p.ct., or thereabouts? This figure is in agreement with good standard practice under ordinary high-temperature oven practice. Again, if the coke figure is right, the coke as weighed would contain 16 25 p.ct. of moisture.

Aug. 18, 1924. SIMPLE SIMON.

Smokeless Fuel.

SIR,—I am pleased to see that this important subject is now receiving the attention of the gas industry, and that the President of the Institution of Gas Engineers made a point of it in his address.

I have been studying this proposition for many years. About thirty-six years ago, at Sligo, I made a specially soft coke to take the place of turf for burning on the hearthstone without a grate, which proved very popular. About sixteen years ago I had three years' experience with the Coalite Company as their Consulting Engineer. About the years 1913-16, when at Hythe, I made a smokeless fuel from Kent coal (Tilmanstone slack) and marketed it as "Kent Char." This found a ready sale at a good price. Since then I have been experimenting on these lines, and have succeeded in making a fuel which affords an absolutely satisfactory substitute for charcoal.

There is an enormous market for this product in Italy, and very high prices are obtainable. You can imagine what this business is when I tell you that I am paying £8 sterling a ton for charcoal, delivered at my villa.

The smokeless fuel required must contain the maximum amount of volatile matter, must not produce smoke, and must ignite readily. I know from my own experience that this fuel can be easily made; and it is only a question of the young generation of gas engineers putting their brains to work and tackling the business. It is a gas engineer's job, and a very profitable one. There is also a splendid market here for good soft coke—not the hard Newcastle variety, but the old-fashioned coke.

I hope to be in London from Aug. 20 to Sept. 6, and I would like to meet any of my old friends who are interested in this important business, and discuss it with them. Any letter addressed to me at the Engineers' Club, Coventry Street, London, will find me.

Villa Soaglia, Mondello, Aug. 12, 1924. C. B. TULLY.

MISCELLANEOUS NEWS.

CHEAPER GAS AT SHEFFIELD.

The Sheffield Gas Company have made further reductions in their prices for gas, as follows : Up to 500 therms, from 7½d. per therm to 7d., or 2s. 11d. per 1000 c.ft. ; from 500 to 2500 therms, from 5⅞d. per therm to 5⅝d. per therm, or 2s. 3d. per 1000 c.ft. ; from 2500 to 15,000 therms, from 5⅝d. per therm to 5½d., or 2s. 2d. per 1000 c.ft. ; from 15,000 to 30,000 therms, from 5½d. to 5d. per therm, or 2s. 1d. per 1000 c.ft. ; over 30,000 therms, from 4⅝d. to 4d. per therm, or 1s. 8d. per 1000 c.ft.

The reductions will take effect from the September readings of the meters. This is the third reduction in prices that the Company have made since last September. The second one was given at Christmas. The three reductions represent a total sum of £80,000 ; the last one representing £30,000. Mr. Ralph Halkett (the General Manager) explains that the reductions were made with a view to helping Sheffield trade, and relieving unemployment.

PORTSEA ISLAND GAS LIGHT COMPANY.

At the Half-Yearly Meeting of the Company, held yesterday, the Directors presented their report for the six months ended June 30.

The profit and loss account shows an available balance of £61,876, and the Directors recommended that a dividend be declared for the half-year at the following rates per annum—viz., 13 p.ct. on the "A" and "B" shares ; 12 p.ct. on the "C" shares ; 10 p.ct. on the "D" and "E" shares ; and 5 p.ct. on the 5 p.ct. (maximum) stock, payable, less income-tax, on Sept. 1 next, leaving £43,193 to be carried forward.

It is with deep regret that the Directors record the death of their colleague, Mr. F. M. Aylen, after 28 years' faithful service as a member of the Board. They have appointed Mr. W. Doig Gibb, O.B.E., M.Inst.C.E., to fill the vacancy, and believe that his long and close association with the gas industry will prove a valuable asset.

The quantity of gas sold continues to show considerable expansion ; the number of consumers has increased, and a large additional number of gas consuming appliances was supplied. In order to provide for the continued increase in the demand for gas, additional manufacturing plant is being erected at the Hilsea Works. Premises have been acquired in London Road, North End, and will shortly be opened as a branch office and showroom, in place of the temporary office in the same district.

The price of gas was further reduced by 0·4d. per therm (equal to 1·8d. per 1000 c.ft.) from the last March quarter, making the present charge to ordinary consumers within the borough 8·2d. per therm, or 3s. 0·9d. per 1000 c.ft.

In March last, the Portsmouth Corporation made an application to the Board of Trade for a reduction of the standard price of gas prescribed in the Portsea Island Gas (Charges) Order, 1921, which regulates the rates of dividend payable by the Company. An official inquiry into the matter has been held, and the decision of the Director of Gas Administration is now awaited.

The Directors recommended donations of £100 and £10 10s. to the Royal Portsmouth Hospital, and the Portsmouth and Southern Counties Eye and Ear Hospital respectively ; also the distribution of 100 tons of coke among the poor residents within the limits of the Company's supply during the ensuing winter.

Newport Gas Company.—The distribution of prizes to the successful competitors in the cultivation of allotments and gardens at Crindan occupied by employees of the Newport Gas Company took place last Friday. Mr. G. Green, J.P., Chairman of Directors, made the presentations. He said that the display of produce was a magnificent one ; and it was gratifying to know that the number of entries constituted a record.

Hathersage Gas Company.—In their nineteenth annual report, the Directors of the Hathersage Gas Company record a profit on the past year's working of £2096, and they recommend a dividend at the rate of 8½ p.ct. for the year, less income-tax, carrying forward the sum of £1573. The Directors state that, to cope with the increasing demands for gas, 4000 new ordinary shares were issued, and the whole of these were taken up by the existing shareholders. The Company now have an issued capital of £25,000.

Leatherhead Gas and Lighting Company.—The Directors' report for the year ended June 30 shows a gross profit of £7286. A further dividend of 5½ p.ct. is recommended, making, with the interim dividend of 2½ p.ct. paid in March last, 8 p.ct. (less income-tax) for the year. The sale of gas has increased by 9½ million c.ft., and a reduction in the calorific value, from 500 to 470 B.Th.U., has been made. The Directors have decided to reduce the price of gas from the Michaelmas quarter by 0·7d. per therm, equal to about 3d. per 1000 c.ft. This will make the price in the Leatherhead area 12 8d. per therm (5s. per 1000 c.ft.) and in the Cobham area 13·2d. per therm,

ALDERSHOT GAS, WATER, AND DISTRICT LIGHTING COMPANY.

Co-Partnership Festival.

The Annual Meeting of the Co-Partnership Fund and the Hospital and Benevolent Fund was held at the Ash Road Works last Saturday afternoon. Among those present were Mr. R. W. Edwards (Chairman and Managing Director) and Mrs. Edwards; Mr. Thomas A. Braddock (Deputy Chairman); Messrs. C. P. Crookenden (with Mrs. Crookenden) and B. R. Green (Directors); Rev. E. Garth Ireland (Vicar of Aldershot); Alderman James May, C.C.; and Mr. C. A. L. Calvert (Chairman of the Aldershot Trades and Labour Council).

The CHAIRMAN said: There is a duty which must precede the business of these meetings, and that is to record, with intense regret, the death of our late Deputy Chairman, Dr. Stroyan, who was identified with the Co-Partnership Scheme and the Hospital and Benevolent Fund throughout.

Dr. Stroyan, in speaking last year, was emphatic in his sympathy with co-partnership, and claimed the parentage of it as applied to this Company, which no one was likely to dispute, for it was during the time he was Acting Chairman of the Company that the scheme was first introduced to the employees. Therefore I ask you to rise in silence to signify your respect to the memory of our late friend.

I am now to introduce to you our new Deputy Chairman, in the person of Mr. Thomas A. Braddock, who has been a Director since November, 1913. Mr. Braddock has shown throughout these years a pronounced interest in all our affairs; and I am confident that he will satisfactorily fill the gap created by Dr. Stroyan's death. Mr. Braddock is a man of affairs, and is associated with large businesses in other parts of the country, and fully realizes how important it is that the interests of the employee should be at all times safeguarded. Mr. C. P. Crookenden is our new Trustee, in place of Dr. Stroyan. Mr. Crookenden has been a Director of the Company since Februarv, 1914, and has prominently identified himself with the interests and welfare of all our employees. Mr. Crookenden is so widely associated with many concerns that he realizes the duty and pleasure in studying the welfare of those who are employed by the Company. Our new colleague, Mr. B. R. Green, fills the vacancy on the Board. Mr. Green has had a life-long experience in the gas industry, and has always shown his deep interest in the well-being of the employees. Mr. Green is on the Board of the South Suburban Gas Company; and you will realize how much he will be of value to the Company generally, and in regard to these welfare schemes. He is also a Director of the Wandsworth Gas Company. We welcome Mr. Green among us, and hope that he will be spared for many years to be with us.

CO-PARTNERSHIP.

With regard to the report and accounts, the adoption of which it is my duty and pleasure to move, there is but little to add on this occasion to what has already been stated briefly and very much to the point in the printed report. It is gratifying to know that, by the efforts and co-operation of the employees, the price of gas was brought down from a figure of 16d. in Midsummer, 1921, to 10·8d. in Midsummer, 1924. In the out-districts, in the "B" area (which includes Farnborough, Frimley, and Fleet) the price was reduced from 17·2d. to 11·4d.; while in the other areas there have also been substantial reductions. These reductions represent an annual saving of some £50,000 to the consumers, and advance the dividends on the sliding-scale capital of the Company by only £820. In the ordinary course, gas companies divide the surplus profits equally, or, in the larger companies, the proportion varies from one-third to (in one or two cases) one-fourth, so that you will see that in our case, instead of half or one-third of the surplus profits going to the shareholder, the *pro rata* proportion has only been one-sixtieth. Generally the whole of the ordinary capital of a gas company is under the sliding-scale, but in our case only 12 p.ct. It is, however, a source of great regret that owing to circumstances beyond our control, the price has had to be increased from Midsummer Day. I do not wish to make any unnecessary reference to this, except to say how much we deplore having had to take the step.

Making comparison with friends in another similar company, we find that their co-partnership bonus is 8¼ p.ct. This, I am sure, is very gratifying to that company, and compares very favourably with that which we are declaring. Incidentally, I might say that this Company have spent for development purposes new money to the extent of £69,500 during the past eighteen months; and we have considerable new schemes waiting to be launched when the moment appears to be more appropriate than at present. There is also another matter to which I think we will give attention as time goes on, and that is the question of suitable medals for employees who have served the Company for 25 years and over. This matter will be referred to the Co-Partnership Committee for consideration at an early date.

Last year I travelled over the ground very fully as to the principles of co-partnership, coupled with national welfare; and I am confident that these principles are to-day just as important. In this era of competition among nations, none will be better served than by the principle of employers and employees working and sharing together in double harness. If some such system could be adopted in our railways and coal mines, I am sure there would not be these frequent differences and labour troubles. There is no industry to which the machinery of co-partnership cannot be applied; for if there is a will there is surely a way. If in the case of gas companies, with their peculiar statutory dividend control arrangements, a pivot can be found on which co-partnership can operate, surely in an ordinary commercial undertaking this can likewise be found. In our competitors' case—such as electricity companies, who are not curtailed and limited in their dividend in the same manner as the gas industry—there could be a very simple, and, I am sure, a successful arrangement. It is not, however, for me to point out this to our competitors—for, though we run an Electricity Department, we are largely gas—excepting to congratulate them on the very much better financial facilities that they enjoy as compared with the older industry manufacturing gas. In my judgment it will not be many years before Parliament will be called upon to free the gas industry from these old-fashioned sliding-scale restrictions, and place them on an equal footing with their competitors in the supply of light, heat, and power.

HOSPITAL AND BENEVOLENT FUND.

This fund has a different object, and is a complete contrast to co-partnership, though, in principle, it is co-partnership on a very high moral scale, because it brings out between human beings all that is best in the great bond of sympathy, which is so acceptable at all times, and especially in illness and trouble. Our hospital and benevolent fund has now operated since Jan. 1, 1917, and its work is not hampered by red tape or unnecessary rules. It is controlled by a Committee elected by the subscribers annually, and whose work is so far reaching that no genuine case can possibly pass without attention. Not only is relief granted in cases of accident or sickness, but when the stage of convalescence is reached the Committee's labours still continue, in sending those who have suffered to suitable convalescent homes at the seaside, to be restored to their normal health. Every one of the hospitals with which we are associated is at all times most anxious to help—either in emergencies, or in cases where an operation or some special treatment is necessary. To the convalescent homes, particularly to Rustington, I cannot tell you how much we are indebted. Our men have got a deep affection for the Rustington Convalescent Home, for so many of them have spent there their two or three weeks, after serious illness, and have come back feeling better and stronger men, able to continue the duties they are called upon to perform.

The great satisfactory feature of this fund is that, notwithstanding the many calls upon it, it is now able to find itself with a reserve of nearly £300. This figure does not appear financially huge, but it represents savings over and above the expenditure, which is, sometimes, necessarily heavy; and I trust the fund will go on accumulating stronger and stronger reserves, so that should it at any time be met with serious cases, which require special treatment and heavy expenditure, it will then be in a position to see the matter right through to a satisfactory conclusion.

Before I move the resolution as to the adoption of the respective reports and accounts, I would like to say a few words on another of our efforts, that is, our Sports Club. This body is merging from the chrysalis stage; and I have great hopes that in the near future tremendous benefit will be derived by all employees of the Company, male and female. Its facilities are being widely increased, and the Committee who manage its affairs are showing themselves to be very wide awake. Next year we hope to have greater privileges for the recreation of our employees, and as time goes on, as I have stated on many occasions, I am hopeful to see during my time as Chairman of the Company an Institute on these works, wherein the employees may find winter recreations, of a physical and mental character. When that is done, together with our Sports Club in the summer, I feel that the coping stone will have been placed on our work with regard to the Co-Partnership Scheme and our Hospital and Benevolent Fund, and the welfare of the body and mind in the spare time through the Sports and Recreation Club.

I now move the adoption of the reports and accounts respectively of the Co-Partnership and Hospital and Benevolent Funds for the year ended June 30, and will invite the Deputy Chairman of the Company to second this resolution.

Mr. T. A. BRADDOCK, the Deputy-Chairman, seconded the motion, and referred in most sympathetic terms to the principle of co-partnership and its effect upon the relations between the employer and employee, and the quality of the work produced by the latter.

Mr. B. R. GREEN, in moving a vote of welcome to the visitors, referred to co-partnership as a medicine which he had heard described as a panacea for all ills in the labour world, and expressed himself whole-heartedly in accord with the movement.

On the proposition of the Gas and Water Engineer (Mr. A. V. BARRACLOUGH), seconded by the Chief Chemist (Mr. D. RITCHIE), a hearty vote of thanks was passed to the Chairman for his conduct of the meeting and of the Committees during the past year, associating with this vote the name of Mrs. R. W. Edwards, whose sympathies with the aims of both schemes is well known.

On behalf of the members, the youngest lady member of the staff, Miss H. Nicholson, presented a bouquet of carnations to Mrs. Edwards.

Following the business meetings, sports were indulged in, refreshments served, and concerts rendered.

During the afternoon there was a parade of the Company's horses; prizes being awarded to the carmen who, in the opinion of a Committee, had kept their animals and vehicles in the best condition. The prizes won at the Aldershot Command Horse Show in respect of heavy trade turn-outs, when the Company took first and third places, were also presented to the successful carters.

At the close of the evening concert, Mr. BARRACLOUGH expressed, on behalf of all, hearty appreciation and thanks to the Chairman and Directors for the lavish hospitality provided.

Colwyn Bay Gas-Works Fatality.—Last week the inquest took place on Edward R. Jones, son of Mr. W. Jones, the works foreman, who was killed on the 9th inst. by being crushed under the mechanical stoker in the retort-house. The jury returned a verdict of "Accidental death," and recommended greater precautions to keep children and unauthorized persons off the works.

Barnet District Gas and Water Company.—On Monday the Directors will submit their report for the half-year ended June 30. The balance standing to the credit of profit and loss account amounts to £41,187, out of which the Directors recommend the declaration of a dividend, less income-tax, for the half-year at the rate of 10 p.ct. per annum on the "A," "B," and "C" stocks, and 7 p.ct. on the "D" capital gas and water stocks. The Directors report with deep regret the death of their Chairman, Mr. A. F. Phillips, who was a Director of the Company for twenty-three years.

GAS REGULATION ACT APPLICATIONS.

There has appeared in the "London Gazette" the following further notice regarding an application to the Board of Trade under the Gas Regulation Act.

Biggleswade and District Gas Company.

The Biggleswade and District Company, Ltd., are applying to the Board of Trade for a Special Order under section 10, to authorize them to acquire the undertakings of the Arlesey and District Gas Company, the Potton Gas and Coke Company, Ltd., the Sandy Gas Company, Ltd., and the Shefford Gas and Coke Company, Ltd., to raise additional capital, to purchase additional land, &c.

GLASGOW CORPORATION CHEMICAL WORKS.

The fifth Annual Report of the Glasgow Corporation Chemical Works Department states that the result of the financial year's work has been much better than was anticipated a year ago, and taking into account the depressed state of the sulphate of ammonia market, and the uncertainty of the tar products market, is very satisfactory. The prices obtainable for sulphate this year have been less than those of last year by £2 10s. per ton. The net revenue from this source is £22,000 less this year than it would have been had sulphate of ammonia commanded last year's prices.

Tar and tar products prices commenced the year at a fairly high level, and maintained this for the first three months of the financial year. In September prices began to decline. They rallied or recovered a little in October, only to fall away from the beginning of November, for a short time gradually, and then rapidly. The pitch market suffered a severe set-back; prices falling in a few weeks from £7 per ton down to £2 10s. per ton. The last seven months of the financial year showed a considerable decline in the prices of all tar products, and the price of crude tar is only half what it was at this time last year.

After paying all working expenses, &c., and £26,859 for rates, taxes, and interest on book value of the plant, the net surplus revenue is £270,787—being a decrease of £4781 as compared with last year.

The prospects for the financial year 1924-25, it is stated, are not very promising. Both the sulphate of ammonia and tar products markets are depressed, and at the moment show no sign of revival. A slight tendency to lower values than are being obtained is noticeable, and there is little forward buying going on in pitch and creosote oil. Under present conditions it is not possible to estimate the revenue for tar and ammonia products at more than about £140,000.

INSTITUTION OF PUBLIC LIGHTING ENGINEERS AND SUPERINTENDENTS.

Glasgow Annual Meeting.

From Mr. W. J. Liberty, Hon. Secretary of the Institution, we learn that in response to an application made to the Ministry of Health that, in the case of those authorities whose accounts ara subject to the audit of the district auditors, a general sanction should be given to the payment of expenses of delegates attending the annual general meeting at Glasgow, the following reply has been received.

Sir,—I am directed by the Minister of Health to refer to the question of the payment by local authorities of the expenses of delegates attending the annual general meeting of the Institution of Public Lighting Engineers and Superintendents, to be held at Glasgow next month. In reply, I am to state that the Minister would be prepared to consider applications from local authorities whose accounts are subject to Government audit, for sanction to the payment of the expenses of the attendance at the meeting of not more than two delegates, one of whom should be the engineer or superintendent for public lighting in the district.

Ministry of Health, S.W. 1.
Aug. 11, 1924.

From a list of members of the Institution we note that there are 49 members, 23 associates, and that Mr. F. W. Goodenough is an Honorary Member. The following are members of Council: Messrs. E. Beveridge, C. Chambers-Smith, W. H. Chapman, R. Davison, S. B. H. Langlands (President), W. J. Liberty, R. Mason, E. F. Spurrell, E. M. Severn, T. Wilkie, and E. J. A. Stewart.

Results at Peterhead.

The annual report of Mr. W. S. Easson, the Engineer and Manager of the Peterhead Gas Department, shows that during the year ended May 15, 60,304,000 c.ft. of gas were manufactured—2·1 p.ct. more than in the previous year. The gas accounted-for was 57,983,000 c.ft., so that the leakage was only 3·8 p.ct. On the expenditure side, £9878 was spent on coal during the year. The carbonizing charges amounted to £1819, a decrease of £75, while the purifying charges were light, being only £61. The expenditure in connection with residual products was £1582. The maintenance of works and plant cost £1154, and repairs and renewals to meters, and attendance to consumers cost £1094. The sum of £3288 was carried to the net revenue account, of which amount £1067 was paid to sinking fund, £1019 went as interest on loans, £408 was paid in income-tax, and £56 was reserved for bad debts. The depreciation and renewal fund was brought up to £1400, which amount it was considered necessary to have in order to carry out any large renewal in the future.

THE NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

It is still difficult to find any change in the market. Perhaps there has been slightly more inquiry circulating during the past week; but in actual business there is no improvement to record. The continued entire absence of booking ahead is very disappointing, and rather indicates that buyers are under the impression that rock-bottom prices have not yet been reached. Sellers can see very little prospect of cheapening production costs under present conditions, especially as wages are very little above the minimum. Shortage of production, due to practically every colliery working short time, so far shows no signs of levelling up supply and demand. In the meantime, no matter what prices are quoted, there is positively nothing like enough business to go round. Wear Specials and best-quality gas are still as firm as anything in the market, the former quoting 23s., and Holmside, Boldon class, 22s. to 22s. 6d. It is said that these prices are obtainable for such odd spot cargoes as come along. Second-class gas makes are extremely weak and plentiful at 18s. to 19s. 6d. It is very doubtful whether there is this difference in value, and it is probably only the stronger market position of the better qualities which enables them to maintain their quotation.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

There is practically no change in the coal trade in Yorkshire; but from Lancashire come reports of a slight improvement. If there is any better demand in Yorkshire, it applies only to best South Yorkshire hards for shipment, and has been brought about by the prospect of a stoppage at collieries next week for Barnsley feast, and another early in September for the Doncaster race meeting.

A better feeling has prevailed in the inland trade so far as domestic coal is concerned. Industrial coal is at a low ebb, and there is no improvement to report either in the price or in the volume of trade.

The demand for gas coal is at its lowest, and some of the principal gas-works in Yorkshire have been unable to take in their regular contract quantities during the past ten or fourteen days.

The export trade is about as lifeless as it can be. Furnace coke for export is, if anything, a little weaker, and the prospects are not at all bright. It is expected in many quarters, particularly on the Continent, that, should there be a European settlement, the Germans will flood the European markets with coal from the Ruhr, and thus help to bring down prices still further. On the other hand, it is well known that the majority of the collieries are losing money even at to-day's prices. The loss in June was approximately 7d. per ton in Yorkshire, and in July it must have been greater.

Prices at Hull at the week-end were:—Bunkers: Yorks, Derby, and Notts large screened steam, f.o.b. Humber ports, 20s. to 21s. per ton. Cargo for export, f.o.b. usual shipping ports: Best Yorkshire hards, association, 23s. 7½d. to 24s.; Derby best hards, 24s. to 25s. 6d.; West Yorkshire Hartleys, 20s. to 22s.; South Yorks washed doubles, 20s. 3d.; South Yorks washed singles, 19s. 6d.; dry doubles, 16s. to 17s.; South Yorks washed smalls, 16s.; Derby slack, 1 in., 13s. 9d.; South Yorks rough slack, 14s. 6d.; gas coke, 35s. to 36s.; foundry furnace coke, 26s. 6d. to 27s.; washed smithy peas, 21s. 6d. to 25s. 6d.; washed steam thirds, 19s. 9d. to 20s.; South Yorks washed trebles, 21s. 6d. per ton.

Prices at the Lancashire collieries are unchanged. For best house coal 34s. to 35s. per ton was quoted, for unscreened industrial coal 21s. to 22s., and for slacks from 13s. to 16s. per ton.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

There are no market movements worth noting in the gas coal trade of the Midlands. By increasing their storage accommodation and making fuller use of facilities already existing, the gas-works have considerably strengthened their reserves. Probably at no previous time has such large provision been made during the slack season for the contingencies of the winter. This is equally applicable to the house coal trade. Both merchants and consumers continue to stock on a bigger scale than heretofore. The test to which the effective capacity of the industry under a seven-hour day was subjected last year has warned the public, as well as those immediately concerned in the distribution of coal, that supplies can only be ensured by making freer use of resources when consumptive demand is not pressing. Values have a tendency to firm up. The special concessions which were offered in June and July to stimulate stocking are no longer available; the regular list prices applying. Conditions remain very sluggish as regards works fuel. The unresponsiveness of the market has been accentuated, of course, by the holiday season. Many pits in this area have been unfavourably affected by the wakes in Lancashire; but now that these are coming to an end, some new impetus is expected. Blast-furnace coke is plentiful. Three South Staffordshire furnaces which were thrown idle by a sectional strike are now going again.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Aug. 13.]

Nos. 18,534 to 18,985.

Brooke, R. M.—"Gas purifiers." No. 18,756.

Minerals Separation, Ltd.—"Manufacture of fuel briquettes." No. 18,750.

Sté. L'Air Liquide, Sté. Anye. pour l'Etude et l'Exploitation des Procédés G. Claude.—"Purification of coke-oven gases, &c." No. 18,793.

Staniforth, H.—"Apparatus for controlling lighting, &c., of gas burners." No. 18,736.

Wood, L. A.—See Minerals Separation, Ltd. No. 18,750.

TRADE NOTES.

Messrs. J. Blakeborough and Sons, Ltd.

This well-known Brighouse firm of engineers have published a new booklet dealing with their gas valves and accessories. It is excellently prepared, and will be very useful to gas engineers.

Columbus Separating Plant.

Orders have been received by Columbus Machinery, Ltd., for installations of separating plant for the Liverpool Gas Company, Gt. Yarmouth Gas Company, and the locomotive sheds of the Great Western Railway Company.

The Automatic Light Controlling Company, Ltd.

This enterprising firm have recently issued a motor road map of England and Wales, copies of which are being sent to every Council Surveyor and Gas Engineer in the British Isles. It is an admirable production, and, like their automatic controllers, will be found extremely useful.

London Midland and Scottish Railway Contracts.

Contracts for plant to the value of £120,009 have been placed by the London Midland and Scottish Railway Company during the last few months, including the following: Gibbons Bros., Ltd., Dudley—installation of retort beds and arches for reconstruction of gas-works, Crewe; C. & W. Walker, Ltd., Newport, Salop—1 million c.ft. gasholder; and Peter Lind & Co., London—gas purifying plant.

The Selas Gas and Engineering Company, Ltd.

Consequent on the reorganization of the Selas-Turner Company, Ltd., the firm have adopted the above title. Under the new management, we understand, important improvements in apparatus have been evolved and patented, while the numerous patents of the original Selas Company, Ltd., and the Selas-Turner Company, Ltd., will continue to be controlled by the Selas Gas and Engineering Company, Ltd. Efficiently organized departments specialize in the following branches: Furnaces of all descriptions, textile heating equipment, baking, enamelling, and other ovens, and industrial lighting.

The Three-Centre Crown Retort.

A description of an interesting form of silica retort has been sent to us by the Russell Engineering Company, of St. Louis. This three-centre crown retort has high sides which allow room for a heavy charge and ample space for the drawing rake. This shape, it is claimed, economizes space, and the reduction of vacant space increases the velocity of the gas passing to the off-take pipes. Thus carbon deposits are increased, and there is less danger of the formation of naphthalene and pitch. Another advantage lies in the fact that the weight of the setting is on the blocks, and not on the retorts.

The Power-Gas Corporation, Ltd.

This firm have received an order from Synthetic Ammonia and Nitrates, Ltd., Birmingham, for: (1) Three waste-heat boilers to work in conjunction with the mechanical water-gas generators, each rated at 2 million c.ft. of gas per day, which were constructed and installed by the Power-Gas Corporation, and have been in operation for some little time. The boilers are designed to utilize the heat of both the blow and the make gases. (2) A coke-gas producer plant to generate per twenty-four hours 3⅛ million c.ft. of gas, cooled and cleaned for process work. The installation will comprise two water-jacketed mechanical producers, with washing and cleaning plant, blowers, overhead fuel bunker, housing, &c.

"Easy-to-Read" Thermometers.

There are many applications in industry where glass thermometers are employed, but where dial thermometers would give more efficient service if they could be obtained at approximately the same cost. With this object in view The Cambridge Instrument Company, Ltd., of No. 45, Grosvenor Place, London, S.W. 1, are introducing a series of "Easy-to-Read" dial thermometers, which they state can be confidently used without incurring any more expense than if high-grade glass thermometers were employed. A number of standard patterns and ranges have been evolved, which will be added to from time to time as the demand arises. Cambridge dial thermometers are so designed that changes in the temperature of the indicator or of the flexible tubing do not effect the accuracy of the readings.

Harpenden Gas Company.

The ordinary general meeting of the Harpenden District Gas Company was held last Wednesday—the Chairman (Mr. T. H. Martin) presiding. Presenting the statement of accounts for the year to June 30, he pointed out that the amount received for gas had fallen, owing to the Company having reduced the price 1d. per therm at Michaelmas, 1923. The balance carried to profit and loss account was slightly reduced, but it enabled the Company to pay dividends at the same rates as last year—namely, 10 p.ct. per annum on original and additional (8 p.ct. standard) capital stocks, and £7 8s. p.ct. per annum on additional capital stock (6 p.ct. standard), less income-tax and subject to the interim dividend already paid. Additional land had been acquired during the year, and a Special Order under the Gas Regulation Act had been granted, empowering the Company to extend their works, and for the conversion of capital and other purposes. Additional capital stock of £7000 had been raised during the year at an average price of £106 1s. per £100 of stock. Further extensions of mains had been made to supply the Roundwood Estate, and for other new estates being developed. A new gasholder of 500,000 c.ft. capacity was being erected upon the land recently acquired. The meeting ended with a vote of thanks to the Chairman and Directors, to the Engineer and Secretary (Mr. E. H. Martin), and to the staff.

Public Lighting at Sheffield.—The Lighting Engineer reports that, during August, 35 additional lamps have been relighted, 13 new lamps erected, and 1242 upright burners replaced by inverted. Of the 12,579 gas lamps in the city, 11,438 are now lighted, and all the 290 electric street lamps are in commission.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Aug.* 18.

The market for pitch continues quiet, and in the absence of business the price is without change. Creosote is also quiet at from 6½d. to 6⅝d. per gallon. Pyridine is in active demand, and the price is about 19s. per gallon. Solvent naphtha is about 1s. 6d. to 1s. 7d. per gallon; pure benzole, about 1s. 9d. per gallon; and pure toluole, about 1s. 10½d. per gallon. Other products are unaltered.

Tar Products in the Provinces.

Aug. 18.

The average values for gas-works products during last week were: Gas-works coal tar, 39s. to 44s. Pitch, East Coast, 55s. to 57s. 6d. f.o.b. West Coast—Manchester, 50s. to 52s. 6d.; Liverpool, 51s. to 52s. 6d.; Clyde, 52s. to 55s. Benzole 90 p.ct., North, 1s. 5d. to 1s. 6d.; crude 65 p.ct. at 120° C., 1s. to 1s. 1d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 10d. Toluole, naked, North, 1s. 5d. to 1s. 6d., nominal. Coal tar crude naphtha in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, liquid, 5½d. to 5¾d.; salty, 5d. to 5½d.; Scotland, 5d. to 5½d. Heavy oils, in bulk, North, 9d. to 9½d. Carbolic acid, 60 p.ct., 1s. 10d. to 1s. 11d. prompt. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Salty Creosote.

In our issues for July 30 and August 6, through inadvertence the quotation for salty creosote was omitted. We regret the inconvenience to correspondents. The quotation which should have appeared in both reports was: 5¼d. to 5½d.

Manchester District Tar Prices.

The average price realized for the sale of tar in the Manchester district, according to the sliding-scale, for the month of June was £2 16s. 0·50d.

British Sulphate of Ammonia Federation Prices.

The British Sulphate of Ammonia Federation, Ltd., in announcing their prices for September and October delivery, write:

"In spite of the advance in prices over the low figure of £14 per ton, at which we have sold a large quantity for July/August, sulphate of ammonia is still by far the cheapest form of nitrogen available. Our deliveries to British farmers during the past season showed a satisfactory increase over deliveries in the previous year; and we feel sure we can rely on your co-operation to secure even better results this year. In order to avoid risk of disappointment in the spring, it is desirable that a certain portion of home requirements should be bought for early delivery. Neutral sulphate of ammonia, if stored in a dry and suitable building, will keep indefinitely in good condition, and without loss. It is understood that quantities purchased at the price stated below will be used for home agricultural purposes only. Prices for November will be announced later.

"We offer to sell sulphate of ammonia for home agricultural use at the following prices:

For September delivery 1924, £14 2s. per ton.
For October delivery, £14 4s. per ton for neutral quality in fine friable condition, free from lumps, basis 21·1 p.ct. nitrogen.

Delivered to consumer's nearest station or wharf in Great Britain, for prompt cash payment, in lots of 4 tons and upwards. Limited quantities of ordinary quality will be available in some districts, and will be sold at 23s. per ton less than the above prices, basis 20·7 p.ct. nitrogen. Neutral sulphate of ammonia, guaranteed not to contain more than ·025 p.ct. free acid, will be sold on the basis of 21·1 p.ct. nitrogen, with no charge if over 21·1 p.ct." The allowances are as stated last month [see "JOURNAL" July 2, p. 196].

Woodall-Duckham Verticals for Edinburgh.—As a result of tests carried out by Mr. H. H. Gracie, Engineer and Manager of the Edinburgh Corporation Gas Department, on the Woodall-Duckham setting at Market Harborough, the Edinburgh Corporation have placed an order with the firm for a setting of 88 retorts, each of a capacity of 8 tons per day, at a cost of £217,000.

Greenock Gas Charges.—The revenue of the Greenock Corporation Gas Department for last year (10½ months) was £101,621, and the expenditure £101,260. The balance of £361, with a credit balance brought forward of £6649, gives a surplus of £7010. It is proposed that the gas charges be reduced to 8d. per therm for prepayment supplies, compared with 9d.; 7½d. to 4½d. per therm to ordinary consumers for domestic and industrial supplies, according to quantity taken, compared with 8d. to 4·4d.; and 7½d. for private stair, public street, and harbour lighting, compared with 8d. The Electricity Department shows an adverse balance on the year.

Shrewsbury Gas Light Company.—The report of the Directors for the year ended June 30 shows a profit of £8452. An interim dividend of 2½ p.ct. was paid in March last. After providing for interest on mortgages, dividends already paid, and a further transfer to reserve fund, the net balance of profit and loss account carried forward amounts to £11,025. The Directors recommend the payment of a final dividend of 3 p.ct. (less income-tax), making 5½ p.ct. for the year. The reserve fund now stands at £13,573, and the special services fund amounts to £2764. There has been an increase of 13½ million c.ft. in the sale of gas, and a keen demand for coke.

STOCK MARKET REPORT.

The Stock Markets generally remained extremely firm during the past week in anticipation of a satisfactory settlement with regard to the evacuation of the Ruhr. Late on Friday evening news came through that the German delegates had decided to accept, in the main, the terms offered them, at the same time appealing for modifications, and some slight concessions were agreed to by France and Belgium. Helped by the prevailing optimism, British Government Stocks were strongly supported and Colonial scrips hardened in sympathy. French Rentes were firm, and there was a good rally in French Shipping Bonds. One of the most interesting events of the week was the advance of 16 points in Grand Trunk Pacific 4 p.ct. debentures, on the announcement that the full 4 p.ct. would be paid for last year.

There was a revival of interest in the Industrial Market, although some of the accepted leaders, such as Courtaulds, Imperial Tobacco, and British American, receded slightly. Signs of home labour troubles are again prominent, the most serious being the threatened strike of electricians.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Aug 16.	Rise + or Fall − on Week.	Transaction Lowest and Highest Prices.
£			% p.a.	% p.a.				
131,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C.	80—83*	−1	..
235,492	,,	,,	4	4	Do. 4 p.c. Pref.	68—72*	−1½	..
1,551,868	,,	Apr. 3	5½	6	Alliance & Dublin Ord.	63—68	..	63½—65½
374,000	,,	July 10	4	4	Do. 4 p.c. Deb.	60—65	..	62½
280,000	5	May 22	8	8	Bombay, Ltd.	5—5½	..	..
100,000	10	Aug. 14	8½	8½	Bournemouth 5 p.c.	12—13*	−½	..
383,110	10	,,	7	7	Do. B 7 p.c.	11½—12½*	−½	..
150,000	10	,,	6	6	Do. Pref. 6 p.c.	10½—11½*	−½	..
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb.	54—59	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	74—79	..	..
992,045	,,	July 10	6 1/16	6 1/16	Brentford A Con.	106—108	+1½	105—106
990,500	,,	,,	6½	6½	Do. B New	106—108	+1½	104½—106½
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	87—92	..	..
306,690	,,	June 12	4	4	Do. 4 p.c. Deb.	75—80	..	..
181,337	,,	,,	—	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	..
214,740	,,	Mar. 6	11½	11½	Brighton & Hove Orig.	171—176	..	..
244,200	,,	,,	8	8½	Do. A Ord.	126—129	..	..
1,287,500	,,	July 24	5	5	Bristol 5 p.c. max.	91—92*a	..	..
855,000	,,	Mar. 20	—	7	British Ord.	117—122	..	118½
100,000	,,	June 26	7	7	Do. 7 p.c. Pref.	118—123	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—77	..	..
100,000	10	May 22	6	8	Cape Town, Ltd.	6½—7½	..	7 1/16—7½
100,000	10	Apr. 24	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb.	71—76	..	..
626,860	,,	July 24	6	6	Cardiff Con. Ord.	97—100	..	..
237,860	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb.	104—106	..	..
157,150	,,	Aug. 14	6½	5	Chester 5 p.c. Ord.	86—91*b	−2	..
1,513,280	,,	July 24	6	6	Commercial 4 p.c. Cap.	88—93	..	89—90½
560,000	,,	,,	6	6	Do. 3½ p.c. Cap.	88—91	..	89
475,000	,,	June 12	3	3	Do. p.c. Deb.	56—59	..	..
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd.	27—32	..	28½—30
200,000	,,	June 12	7	7	Do. 7 p.c. Pref.	79—84	+2	82
660,000	,,	Mar. 6	6½	6½	Croydon sliding scale	101—104	..	103—104
284,975	,,	,,	5	5	Do. max. div.	85—89	..	87—89
492,270	,,	Feb. 21	3	4½	Derby Con.	108—110c	..	..
55,000	,,	July 10	4	4	Do. Deb.	74—76c	..	..
209,000	,,	Apr. 3	5	5	East Hull 5 p.c. max.	..	..	..
1,002,180	10	July 24	2	6	European, Ltd.	7½—8½	..	7½—7½
16,503,045	Stk.	Aug. 14	5½	5½	Gas Light & Coke 4 p.c. Ord.	90—92*	−2	90½—93½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	60—63*	−2	63½
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	78—81*	−2	78½—80
4,761,930	,,	June 12	3	3	Do. 3 p.c. Con. Deb.	60—63	−1	60½—61
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 20	6½	6½	Hastings & St. L. 5 p.c. Conv.	91—96	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	76—81	..	..
70,000	10	May 8	10	10	Hongkong & China, Ltd.	16—17	..	..
86,600	Stk.	Aug. 14	9½	10	Hornsey 7 p.c.	138—143*	−5	..
1,976,000	,,	May 22	10	30	Imperial Continental Cap.	165—170	..	165—167
263,950	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	68—71*	−1	..
235,242	,,	Aug. 14	6½	6½	Lea Bridge 5 p.c. Ord.	95—100*	−2	..
2,127,340	,,	Aug. 14	5½	5½	Liverpool 5 p.c. Ord.	89—90*b	−2	..
600,000	,,	Mar. 20	7	7	Do. 7 p.c. Red. Pref.	103—106b	..	..
165,736	,,	Feb. 21	9	8	Maidstone 5 p.c. Cap.	124—129	..	..
63,480	,,	June 26	3	3	Do. 3 p.c. Deb.	53—58	..	..
75,000	5	,,	5	7	Malta & Mediterranean	3½—3¾	..	..
541,920	Stk.	June 12	4	4	Montevideo, Ltd.	54—59	..	..
1,875,892	,,	July 24	5½	5	Newcastle & Gateshead Con.	82½—83½*d	..	..
250,166	,,	,,	4	4	Do. 4 p.c. Pref.	74—75*d	..	..
529,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb.	70—72	..	..
15,000	10	Mar. 6	11	11	North Middlesex 10 p.c.	16—17	..	..
75,940	10	,,	7 7/10	7 7/10	Do. 7 p.c.*	11½—12	..	11½—11¾
300,000	Stk.	May 8	9	7	Oriental, Ltd.	98—101	..	..
138,120	,,	June 26	7¼	7¼	Plym'th & Ston'house 5 p.c.	112—117	..	..
60,000	50	Mar. 6	13	13	Portsea Island B	102—105	..	..
100,000	50	,,	12	12	Do. C	98—103	..	..
2,289,909	1	—	—	—	Primitiva Ord.	¼—⅛	..	6/6—6/10½
341,400	100	June 2	4	4	Do. 4 p.c. Red. Deb.	75—78	+1	77
600,000	Stk.	July 24	4	4	Do. 4 p.c. Red. Deb. 1911	53—56	..	..
220,335	,,	June 26	4	4	Do. B. Aires 4 p.c. Rd. Db.	54—57	..	..
321,670	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	54—57	..	..
150,000	10	Mar. 20	6	6	San Paulo 6 p.c. Pref.	7—7½	..	7 1/16—7½
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	41—43	..	..
270,000	Stk.	Mar. 20	5	5/8/4	Sheffield A	99—101e	..	..
419,968	,,	,,	5	5/8/4	Do. B	99—101e	..	..
1,047,000	,,	,,	5	5/8/4	Do. C	99—101e	..	..
90,000	10	June 12	6	8	South African	7—9	..	..
6,609,895	Stk.	Aug. 14	6½	5	South Met. Ord.	97—99*	−2	97½—100½
102,580	,,	July 10	5	5	Do. Red Pref.	96—98	..	..
1,895,445	,,	,,	3	3	Do. 3 p.c. Deb.	58—61	..	60½—61
734,000	,,	Mar. 6	6½	6½	Do. 6½ p.c. Red. Deb.	103—105	..	..
91,500	,,	,,	8½	8½	South Shields Con.	136—138d	..	..
1,087,795	,,	Aug. 14	6	6½	South Suburban Ord. 5 p.c.	102—107*	−2	102—103
368,837	,,	June 26	5	5	Do. 5 p.c. Deb.	93—98	..	98
647,740	,,	May 8	6	5	South'mpt'n Ord. 5 p.c. max.	85—88	..	..
121,275	,,	June 26	4	4	Do. 4 p.c. Deb.	73—78	..	..
250,000	,,	Mar. 6	7	7	Swansea 7 p.c. Red. Pref.	104—106	..	..
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	..	..
120,000	,,	July 24	8	8	Tottenham District A 5 p.c.	116—119	..	117½—118
582,275	,,	,,	6½	6½	Do. B 3½ p.c.	99—102	..	..
181,255	,,	June 12	4	4	Do. 4 p.c. Deb.	76—80	..	..
258,251	,,	Mar. 20	5	7/14/4	Tynemouth Con. and New Wandsworth, Wimbledon, and Epsom—	85—88d	..	..
30,000	,,	July 10	9½	9½	Wandsworth A 5 p.c.	132—137	..	..
255,636	,,	,,	7½	7½	Do. B 3½ p.c.	110—115	..	..
108,075	,,	,,	6/7/9	6/9/6	Do. C	96—101	..	..
240,865	,,	,,	6/7/9	6/9/6	New Ordinary	..	..	..
352,000	,,	,,	7½	7½	Wimbledon 5 p.c.	110—115	..	112
98,000	,,	,,	7½	7½	Epsom 5 p.c.	115—120	..	..
88,416	,,	June 26	3	3	3 p.c. Deb.	55—60	..	..

Quotations at:—*a*.—Bristol, *b*.—Liverpool. *c*.—Nottingham. *d*.—Newcastle. *e*.—Sheffield. * Ex. div.

To gas investors the chief interest was centred in the Brentford "A" and "B" stocks, both of which have advanced by 6½ points during the past month. The improvement is attributed to the unofficial report of the Company's absorption by the Gas Light and Coke Company. It will be seen from the table that there are numerous reductions on *ex* div. quotations; otherwise there is little to record.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 4 p.ct. debenture 62½, Brentford "A" 106, "B" 104¼, 105¾, 106, Commercial 4 p.ct. 89, 90½ *ex* div., 3½ p.ct. 89 *ex* div., Continental Union 7 p.ct. preference 82, European 7⅞ *ex* div., Gas Light and Coke 92½, 92⅜, 92⅝, 92¾, 93½, 3½ p.ct. maximum 63⅜, 4 p.ct. preference 80, 3 p.ct. debenture 61, Imperial Continental 166, Primitiva 4 p.ct. debentures 77, South Metropolitan 99½, 99⅜, 100, 3 p.ct. debenture 60⅜.

On Tuesday, Commercial 4 p.ct. 89, 90½ *ex* div., 3½ p.ct. 89 *ex* div., Continental Union 28⅛, 28⅜, Croydon sliding-scale 103, maximum dividend 87, European 7⅞, 7⅞ *ex* div., Gas Light and Coke 92½, 92⅜, 93, 93½, 93¼, 93½, Imperial Continental 167, North Middlesex additional ordinary 11⅛, 11⅜, Primitiva 6s. 6d., 6s. 9d., 6s. 10½d., South Metropolitan 99⅜, South Suburban 5 p.ct. 103, Tottenham "A" 117½ *ex* div., Tuscan 6 p.ct. debenture 71.

On Wednesday, Alliance and Dublin, 64¾, British 118½, Cape Town 7¼, Continental Union 29, 29¼, Croydon sliding-scale 104, maximum dividend 87½, European 7⅞, 7⅞, 7⅞ *ex* div., Gas Light and Coke 92⅜, 93¼, 4 p.ct. preference 80, Imperial Continental 166⅜, 167, South Metropolitan 99⅜, 100½, South Suburban 5 p.ct. debenture 98, Tottenham 118, Wandsworth (Wimbledon 5 p.ct.) 112. Supplementary prices, Ascot 10 p.ct. 8⅜, Danish 60/7½.

On Thursday, Alliance and Dublin 63½, 65½, Brentford "A" 105, 106, Cape Town 7 1/16, Commercial 4 p.ct. 89¼, Croydon maximum dividend 88½, 89, Gas Light and Coke 90½, 91½, 91½ *ex* div., 4 p.ct. preference 78½ *ex* div., 3 p.ct. debenture 60⅜, Imperial Continental 165½, 167, Primitiva 6s. 10½d., San Paulo 6 p.ct. preference 7 3/16, 7¼, South Metropolitan 97½, 98½ *ex* div., 3 p.ct. debenture 61, South Suburban 5 p.ct. 102 *ex* div., Tottenham "A" 118. Supplementary prices, Southend-on-Sea 5 p.ct. consolidated 90.

On Friday, Alliance and Dublin 65, Brentford "B" 106½, Commercial 3½ p.ct. 89, Continental Union 28½, 30, Gas Light and Coke 90⅛, 90⅜, 90⅞, 91⅛, 91¼, 91½ *ex* div., 4 p.ct. preference 78½, 79 *ex* div., Imperial Continental 165, 166, 166½, Primitiva 6s. 6d., South Metropolitan 98, 98⅜, 98½ *ex* div.

Monetary conditions in Lombard Street were again somewhat difficult, and recourse was made to the Bank of England; but at the end of the week the position became easier and money was quite usable—3-3½ p.ct. being the rate quoted in the earlier hours on Friday, while later balances were offered at 2½ p.ct. After advancing steadily for the past two months, the average rate for Treasury Bills received a slight check; this being £3 15s. 3·24d., or 1d. p.ct. below that for the previous week. For the fourth week in succession no Bonds were allotted.

The Exchanges exhibited considerable buoyancy. Sterling on New York closed at 4·54⅛, French francs at 89·05 and Belgian francs at 87. The Milan rate declined to 100 11/16 lire, and the Swedish exchange closed against that country at 17·09. Otherwise "neutral" exchanges showed little variation. The Indian rate recovered to 1s. 5 7/16d.

Silver continues weak, the price falling to 33¾d., there being no support from the East.

The Bank Rate is 4 p.ct., to which it was raised from 3 p.ct. on July 5, 1923. Bankers' deposit rates are 2 p.ct. The deposit rates of the discount houses are 2 p.ct. at call and 2½ p.ct. at notice.

Demy 4to. Limp Cloth. Price 10s. 6d.

THE FLOW OF GASES and PROPORTIONING GAS MAINS.

By

F. SOUTHWELL CRIPPS, Assoc.M.Inst.C.E.

WALTER KING, Ltd., "Gas Journal" Office
No. 11, Bolt Court, Fleet Street, E.C.4.

South Shields Gas Company.—The following dividends, all less income-tax, for the half-year ended June 30 have been declared. On the consolidated stock, 4¼ p.ct.; on the new stock, 4¼ p.ct.; and on the ordinary stock, 2⅝ p.ct.

Cleveland Gas Company.—The report of the Directors for the half-year ended June 30 shows a profit of £746, which it is proposed to carry forward to next half-year's accounts. The Directors regret that the condition of the iron and steel trades is still deplorable, and feel that it would be unwise to recommend the payment of a dividend.

Camborne Gas Company.—Next Tuesday the Directors will present their report for the year ended June 30. The gas consumption shows an increase amounting to over 3 million c.ft. The balance standing to the credit of profit and loss account amounts to £2068, and the Directors recommend the payment of a dividend at the rate of 5 p.ct. per annum (less income-tax). This will absorb £736, leaving £1332 to be carried forward to the next account.

Guards and Gas Fires.—An old suggestion was revived by Mr. H. Oswald when holding an inquest on Nellie Saich, the 4-year old daughter of a carpenter living at Fulham. According to the evidence the mother heard a scream, and on reaching the child found her clothes in flames. The coroner said that the Children Act, which renders obligatory the use of a guard before an open fire, should be so constructed as to include gas-fires. A verdict of "Accidental death" was recorded.

Doncaster Gas Accounts.—As a result of the past year's working the gas-works show a gross profit of £14,629, and a capital expenditure of £200,267.

The Chapel-en-le-Frith Council have decided to light the streets, with gas during the coming winter, and for this purpose to levy a rate of 6d. in the pound.

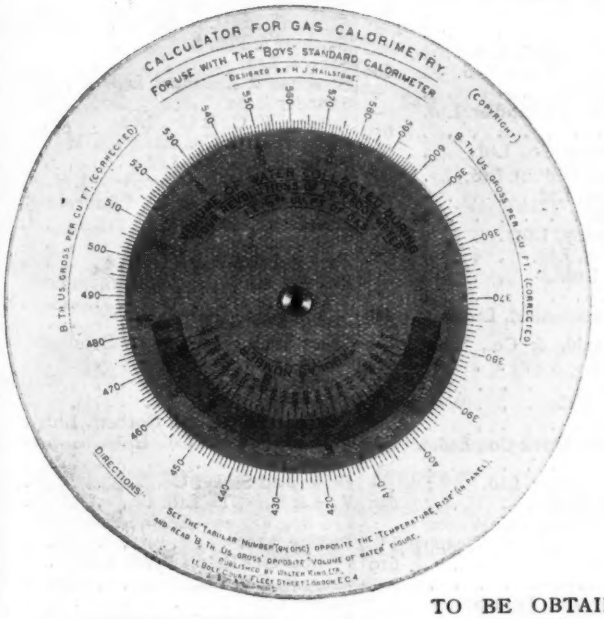
The Shirebrook Council have decided to accept the tender of the Shirebrook Gas Company for the lighting of 158 lamps in the parish for a period of seven months during the coming winter, at a cost of over £494.

The will of the late Alderman James William Newbold, a former Mayor of Derby and for many years Chairman of the Derby Gas Company, who died on May 11, has been proved at £16,061 gross, with net personalty £12,187.

The illustration in the "Kleenoff" advertisement in last week's issue was inserted in error to the exclusion of their usual illustration showing a girl standing by a gas stove, which she has been cleaning with "Kleenoff" cooker-cleaning jelly.

The Halesowen Council have accepted the following tenders for public street lighting during the coming winter: Halesowen Gas Company, £3 15s. per small, and £7 10s. per large lamp; Cradley Heath Gas Company, £4 per small and £8 per large lamp; Rowley Regis and Blackheath Gas Company, £4 1s. 6d. for each lamp.

CALCULATOR FOR GAS CALORIMETRY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